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ABSTRACT

This report examines the feasibility of developing a Colorado statewide union data base to support cataloging, acquisitions, and interlibrary loan functions. It concludes that any data base developed should focus on providing location information for the state's library materials to support patron access to available resources. The title location data base should be supplemented with a directory of specialized resources and by access to on-line and other files containing location information. Functional specifications, a program overview, and implementation plan are offered for developing and maintaining a Colorado title location file for library materials. (Author)

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PROVIDING LOCATION INFORMATION FOR COLORADO LIBRARY RESOURCES

U.S. DEPARTMENT OF HEALTH
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EDUCATION

Karl M. Pearson, Jr.
March 1977

Colorado State Library LSCA Project 76B-I-14

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Western
Interstate
Library
Coordinating
Organization

IR004871

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ABSTRACT

This report examines the feasibility of developing a Colorado statewide union data base to support cataloging, acquisitions and interlibrary loan functions. It is concluded that any data base developed should focus on providing location information for the state's library materials to support patron access to available resources. The title location data base should be supplemented with a directory of specialized resources and by access to on-line and other files containing location information. Functional specifications, a program design overview, and implementation plan are offered for developing and maintaining a Colorado title location file for library materials.

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PROVIDING LOCATION INFORMATION FOR

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GLOSSARY AND DEFINITION OF TERMS

ACCESS POINT - A data element in a bibliographic record that is indexed to allow retrieval on values for that element. For example, catalog records usually have at least author, title, and subject access points.

AV - Audio-visual material. Includes non-book materials except microfilm and microfiche.

BALLOTS - Bibliographic Automation of Large Library Operations using a Time-sharing System. This system, initially developed at Stanford University, began daily on-line operation in November 1972 for Stanford libraries. Cataloging and catalog file search services provided by BALLOTS are now available to other libraries in the West and elsewhere.

BCR - Bibliographical Center for Research, Rocky Mountain Region, Inc., Denver, Colorado. BCR brokers on-line cataloging and search services, provides location information for interlibrary loan, develops communication nets for member libraries, and performs special research projects.

BIBLIOGRAPHIC DATA - Descriptive and subject cataloging information about one or more items of library material, as found, for example, in a MARC record. This data does not include locational or status information about a particular physical copy of the item.

CATALOGING SERVICE - A number of commercial firms offer cataloging support, based primarily on processing of MARC records, but which may include catalog records supplied by other users. The services may supply catalog cards or catalog records on microfilm or microfiche. These services are an alternative to on-line cataloging systems such as OCLC or BALLOTS, and supplement such systems by using the data in those systems to provide customers with microform cataloging.

COIN - Colorado Index of state publications, a computer-based file of bibliographic data maintained by the Colorado State Library.

COM - Computer-output-microfilm. This process allows a computer to "print" on microfilm rather than listing paper, thereby greatly economizing on reproduction and distribution expenses when a number of copies are needed. The microfilm can be cut into strips for use in producing microfiche sheets.

DATA BASE - A file of records maintained by a computer.

ERIC - Educational Resources Information Center, headquartered at National Institute of Education, Washington, D.C. ERIC is a national abstracting and indexing network of clearinghouses providing coverage of journal articles and technical reports in the field of education.

FUNCTIONAL SPECIFICATIONS - A description of what, exactly, a system (particularly one that is computer-based) is to accomplish to satisfy the objectives for which the system is intended. Functional specifications are a means of communicating to the system developer (programmer or analyst) what the user expects the system to do.

ILL - Interlibrary loan, a formal procedure by which one library borrows materials from another.

ISBN - International Standard Book Number, assigned by publishers as a unique identifier for titles that they publish.

ISSN - International Standard Serial Number, assigned by a central organization in each country (LC in the United States) as a unique identifier for a serial publication.

LC - Library of Congress

LCCN - Library of Congress catalog Card Number, a commonly used means of identifying a particular catalog record in machine-readable data bases corresponding to a specific item of library material, usually a monograph.

LOCATION IDENTIFIER - A code that uniquely identifies a specific library to which an ILL request may be sent.

LOCATION REQUEST - An interlibrary loan message sent to another library or bibliographic center for the purpose of ascertaining one or more libraries reported to have the specified item in their collection. This information is needed by the requesting library so it can send a request for loan of the material to a library that is known to hold it.

LSCA III - Library Services and Construction Act. Title III provides federal funds to encourage and stimulate interlibrary cooperation, particularly among different types of libraries, and enables funding of projects involving multistate library cooperation.

MARC - Machine-Readable Cataloging developed at the Library of Congress and following national and international standards for format, content designators and character sets.

MESSAGE SWITCHING - The act performed by the recipient of a message intended for a third party; the recipient sends the message on to that party rather than returning it to the sender after appending the address ("location") of the third party.

MICROFORM (MICROFILM, MICROFICHE) - Microform refers to any type of material recorded photographically and greatly reduced in size. The two main types of microform now in general use in libraries are microfilm, a roll, and microfiche, a sheet or card. Microfilm preserves the integrity and order of an information file, while microfiche allows quick access to a portion of the file, as well as being a convenient way to hold the content of a document.

NCLIS - The National Commission on Libraries and Information Sciences, appointed by the President of the United States for the study and planning of improved library and information services in the nation.

NTIS - National Technical Information Service, a federal agency that distributes technical reports produced by or for the federal government.

NUC - National Union Catalog, a publication providing catalog records and a list of libraries holding each item, as reported to the Library of Congress.

NUMERIC REGISTER - An index to libraries holding a particular title, accessed by the LCCN, ISBN, or ISSN for the title.

OCLC - Ohio College Library Center, a non-profit corporation chartered in the state of Ohio to provide on-line computer cataloging support for libraries using on-line remote terminals linked to the central computer system in Columbus, Ohio. OCLC services to individual libraries are usually managed by regional service centers or networks.

OFF-LINE - Designating the operation of a computer system such that users receive reports and other listings after the system has operated, and must furnish all data and requests for processing before the system is operated again. Off-line operation tends to be cheaper than on-line operation of a computer system.

ON-LINE - Designating the operation of a computer system such that a user working at a terminal has immediate access to the contents of data bases handled by that system, can specify operations to be performed, and can receive the results of those operations as soon as they have been completed.

ON-LINE REFERENCE - Use of an on-line computer system to search bibliographic data bases to obtain lists of citations, abstracts, or information.

RAL - Register of Additional Locations, maintained by LC as a supplement to the National Union Catalog to show libraries other than those listed in the NUC that hold a particular item of library material.

REGIONAL LIBRARY SERVICE SYSTEM - In Colorado, one of seven organizations established to assist member libraries in its geographic area. Such assistance may include facilitation of interlibrary loan, some centralized support for technical processes, continuing education, reference assistance, etc.

SARC - System Area Resource Center, a designated library in each Colorado regional library service system that provides interlibrary loan assistance to system members.

STATEWIDE - Intended for use by, or to represent, all types of libraries within a state's borders.

TITLE IDENTIFIER - A code that uniquely identifies a particular title or item of library material. For example, an LC card number or ISBN (although neither provides completely unique identification).

TITLE LOCATION (FILE, DATA BASE, LIST, TOOL, ETC.) - A set of records maintained for the purpose of showing what libraries hold a particular title or item of library material. The records need not be as complete or accurate as catalog records.

TITLE RECORD - A record that provides sufficient bibliographic information to identify a particular item of library material, and to which can be appended location identifiers showing which libraries hold the item.

UNION CATALOG - A library catalog showing the holdings of two or more libraries. Entries normally contain full bibliographic information describing each item in the libraries' collections.

UNION LIST - A list, usually of serials, that shows what libraries hold each title.

VERIFICATION - The process of checking a bibliographic citation to ensure that it is correct or complete. In interlibrary loan, citations are verified to assist in identifying exactly which item of library material is being requested.

WICHE - Western Interstate Commission for Higher Education, a non-profit organization created by an interstate compact of 13 states in 1953. It is dedicated to cooperative improvement of higher education throughou these 13 western states by the sharing of resources and expertise in that multistate region. The basic program (student exchange across state lines) is funded by state legislatures. Other programs are individually funded through grants or contracts.

WILCO - The Western Interstate Library Coordinating Organization consists of the Western Council of State Librarians, advisors, and (until July 1977) a small staff housed at WICHE. WILCO provides a forum and a catalyst for coordinating and facilitating library resource sharing activities among the western states and Canadian provinces.

WLN - Washington (state) Library Network, supported by its own computer-based bibliographic utility, which is beginning to provide on-line cataloging and acquisitions support to Washington libraries. The service area may be expanded to other Northwest states in the latter part of 1977.

PROVIDING LOCATION INFORMATION FOR COLORADO LIBRARY RESOURCES

1. INTRODUCTION

1.1 BACKGROUND

During the spring of 1976, a group of Colorado librarians met to discuss ways for improving interlibrary cooperation and the services of the state's libraries. These librarians identified three areas in which immediate action should be taken: 1) increased access to reference data bases; 2) development of a union list of serials; and 3) development of a union catalog for monographs. Library Services and Construction Act (LSCA) grants were awarded for projects in each area, and as a result the Colorado State Library contracted with the Western Interstate Library Coordinating Organization (WILCO) to perform a feasibility study and suggest a model for the union catalog for monographs.

In addition to these specific LSCA grant projects, Virginia Boucher, Network Coordinator for the Colorado State Library, is drafting a networking concept paper: Colorado Library Network Plan. That paper describes how the pieces of interlibrary cooperation -- resource location information, interlibrary loan, telecommunications, and reference assistance -- can be locked together in a coordinated structure that builds upon the existing regional library service systems and the traditional sources of strength among Colorado libraries. The draft incorporates the goals, objectives and tasks defined in Libraries Colorado: A Plan for Development (Colorado State Library, 1976) and Library Networking in the West: The Next Three Years (WILCO, 1976). The Colorado Library Network Plan draft is intended to be a focus for the participation of Colorado librarians in planning and implementing a state-based network. This report, describing alternatives for providing resource location information, serves as a technical appendix to the Colorado Library Network Plan.

1.2 STUDY PURPOSE AND METHODOLOGY

As stated in the WILCO LSCA grant application, the project's purpose was:

"Using the preliminary needs statement for a union catalog of monograph holdings described in the Colorado Library Networking Plan, June 1976 [a rough draft working paper], this project will survey existing computer systems and monographic data bases in Colorado to determine appropriate roles and responsibilities in the statewide

network plan. The project will propose modifications and extensions, as necessary, to the State network plan and preliminary implementation strategies."

During initial discussions between WILCO and Colorado State Library staff, it was agreed that the scope of the projected union catalog would be extended to cover all kinds of library materials except serials, and that the main use of the data base would likely be as a means for providing title location information.

In performing this project, WILCO has:

a) Conducted a mail survey of all Colorado libraries (except individual school libraries) to identify local data bases, sources used to obtain bibliographic data, predicted volume of acquisitions for the next three years, and availability of microfiche readers. The results of this survey have been reported in Survey of Cataloging Sources and Volume of Activity in Colorado Libraries (WILCO, 1977).

b) Visited the Penrose Public Library, Colorado Springs; Jefferson County Public Library; and Boulder Public Library to examine their data bases and computer systems.

c) Worked with the Colorado State Library staff to recommend design criteria and analyze alternatives for a statewide title location capability for non-serials materials.

Basically, the methodology employed in carrying out the project entailed gathering information about Colorado libraries that might be pertinent to design of the prospective statewide data base, and then calling upon WILCO staff's knowledge of technology and activities in library automation in other states to identify possible alternative methods for developing and using such a data base. The most important step in this methodology has been the definition of specific objectives for the proposed data base, together with a set of suggested design criteria for evaluating alternative methods for fulfilling those objectives. Having established these, the possible alternatives were analyzed, and the "best" alternative was developed in some detail so that, if Colorado librarians agreed, implementation could proceed immediately.

1.3 SUGGESTIONS TO THE READER

Because much of this report is highly technical, it may be useful here to offer a guide that the non-technical reader may follow. To begin, Section 3 is a summary of information compiled about Colorado libraries through the survey data in Directory of

Colorado Libraries, and the knowledge of the Colorado State Library staff. Given this background information, the goal and most appropriate objectives for a statewide data base are discussed at the beginning of Section 4, and criteria are set up for evaluating how well each possible alternative method fulfills those objectives. In Section 5, the criteria are applied to evaluate the alternatives and to select the one best suited to meeting Colorado library needs. These portions of the report are summarized in the Executive Summary (Section 2). The remainder of the report (Sections 6-8) address the technical details for implementing our recommendations if they are adopted by Colorado librarians. Although these latter Sections may be heavy going for the non-technical reader, they provide the answers to the "how" questions that are sure to arise.

The recommendations presented in this report should be treated as suggestions to inform Colorado librarians as they make the decisions that will shape the course of interlibrary cooperation in Colorado in the years to come. While WILCO's recommendations represent our present estimate of the optimal path to take in developing the capability to locate Colorado library resources, the rapid pace of technological and organizational change may alter the factors upon which these recommendations are based. In considering and acting upon our recommendations, Colorado librarians should look for ways to improve them.

Although the scope of the study was limited to non-serial materials, a recommendation is offered in Appendix B respecting an alternative to a union list of serials to provide improved access to periodicals.

2. EXECUTIVE SUMMARY

Essentially, this report addresses two questions: is a state-wide data base of some kind needed? If so, what form should it take?

In answer to the first question, there does indeed appear to be a need for a state-maintained data base that provides title location information. The desire of Colorado librarians for such a tool has been expressed in Libraries Colorado: A Plan for Development and was reiterated in a series of meetings of a number of the state's librarians in the spring of 1976. Reinforcing this "felt" need, data collected from a survey of 100 western academic and public libraries during the course of WILCO's Cost and Funding Studies (performed during 1976) indicate that the great majority of interlibrary loan requests are filled in-state, but after more than one possible lender has been queried. It is clear that a reduction of the ratio of requests to fills would reduce the current delay and wasted expense in interlibrary loan service caused by lack of information about which library holds a particular title. More importantly, a title location list that could be distributed to most libraries would benefit patrons by informing them what library materials (most of which are purchased from public funds) are available beyond the limits of their local library's own collection. Finally, because of the steeply increasing prices and volume of published materials, cooperative collection development is becoming imperative, and knowledge about which library has what titles is requisite to informed decision-making about what materials should be acquired.

In answer to the second question, several alternative forms were ruled out. From the results of a survey of cataloging practices in Colorado libraries, there appears to be a relatively low and decreasing volume of original cataloging performed (at least, for books); thus, a state-based file intended as a source for cataloging information would have low utility. A union card catalog, such as currently maintained by BCR and some regional library service systems, is increasingly expensive to maintain and cannot be distributed to libraries. A numeric register indexing LC (Library of Congress) card numbers to libraries holding the corresponding materials does not provide enough information to patrons or local librarians who first must find the LC card number before they can use it. Use of an on-line cataloging system for title location purposes would be expensive for public libraries and would not provide the information directly to patrons.

The report recommends, and offers functional specifications and an implementation plan for, a combination of approaches to make title location information available to patrons and local librarians at a reasonable level of cost:

- First, it is recommended that the State Library furnish editorial direction and coordination for compiling a directory of specialized resources, expanding the directory now published by the Colorado chapter of the Special Libraries Association to include local history, document, and non-print collections in all Colorado libraries for which access on an individual title basis would not be cost-beneficial.

- Second, it is recommended that the State Library implement a computer-based statewide title location file for materials newly acquired by Colorado libraries. Listings of the title location file should be produced on microfiche for economical publication and distribution, and should allow access by title, subject and author as well as by LC card number. Holdings data for libraries using OCLC could be included, if desired.

- Third, it is recommended that designated libraries using the OCLC (Ohio College Library Center) on-line cataloging system provide supplemental title location assistance through access to national files of location information as represented in computer data bases (e.g., OCLC, BALLOTS, ERIC, AGRICOLA, etc.) or in printed form (e.g., the National Union Catalog).

The title location file should be generated initially to reflect the titles in the Jefferson County Public Library catalog data base, and perhaps the inventory control file of the Penrose Public Library, Colorado Springs, as well. Thereafter, records should be added to reflect the latest acquisitions of at least 40 key Colorado libraries. Data for these records might be obtained in large part through merging computer records from OCLC and commercial cataloging vendors such as Josten's and Baker and Taylor.

Development of the statewide title location file and associated computer programs can be accomplished in one year with an estimated budget of $99,500. An advisory task force of Colorado librarians should be constituted to assist the State Library staff in designing and implementing the title location file.

3. PERTINENT INFORMATION ABOUT COLORADO LIBRARIES

3.1 INTERLIBRARY LOAN PATTERN

Most public, many academic and a few special Colorado libraries are members of one of the seven regional library service systems into which the state is divided. These regional library service systems have the mission of assisting local libraries and providing access to library resources within a system's area and elsewhere. The Colorado Resource Center has been established at Denver Public Library and a second center has been proposed to support academic libraries. Colorado librarians and citizens have been engaged fairly continuously over the last decade in assessing needs for, and planning, improved library services. The ground for increased interlibrary cooperation is well-prepared.

Currently, locating materials needed by a patron which are not in the local library is somewhat of a hit or miss operation. Smaller public libraries send their requests to their regional library service system area resource center (SARC), normally located in the area's largest public library. If the SARC cannot fill a request from its own collection, it may check to see if another library in the area has the needed material, may ask the Bibliographical Center for Research (BCR) to furnish location information from its multistate union card catalog file, or may forward the request to the Colorado Resource Center. Academic libraries rely upon an array of tools such as the National Union Catalog (NUC) and Register of Additional Locations (RAL), BCR, and the knowledge of librarians in their interlibrary loan departments to locate potential sources for a title that must be borrowed. Special libraries rely primarily on the skill and knowledge of their librarians to identify likely sources for the kinds of information their clientele usually need; such sources are most frequently found at state academic institutions.

The total volume of interlibrary loan (ILL) for Colorado libraries (exclusive of photocopy requests and requests from school and special libraries) is about 50,000 loans per year. Academic libraries borrow about 15,000 titles and public libraries borrow about 35,000. As the ILL statistics reported in Directory of Colorado Libraries-1976 show, a few libraries handle the bulk of the state's interlibrary loan traffic, while a majority of the state's libraries make or fill few loan requests. This loan pattern is not well correlated with library size; many larger libraries do not have much ILL activity, and some smaller libraries make heavy use of ILL.

It is believed (although there are few data available on this point) that most ILL requests from public libraries go to other public libraries and few go to academic libraries. Academic libraries borrow from each other for the most part. Most special library ILL requests also go to academic libraries.

3.2 LIBRARY SURVEY RESULTS

Colorado libraries were surveyed in November and December 1976 to obtain current data on their cataloging practices and volume of acquisitions. The results of the survey are reported in Survey of Cataloging Sources and Volume of Activity in Colorado Libraries (WILCO, February 1977). All but four or five key public and academic libraries responded to the survey. Ranking the respondents by their 1979 forecast of books and non-print materials to be acquired, we can see (Table 1) where these libraries are sited geographically, the cataloging sources they use now or expect to be using within three years, and the range of ILL activity reported in 1975.

The data in Table 1 represent only libraries responding to the survey. Within the Medium or Large class, there are probably three additional libraries, and there is probably one additional library in the Largest class. The response rate for the Small and Smallest classes was about 40%. School districts, of which 6 responded, have not been included in the Table.

Each of the seven regional library service systems contains at least one or two Medium or Larger libraries, although almost half of these are concentrated in the Central Colorado Regional Library Service System area.

The Cataloging column in Table 1 shows how many of each type of library now, or expect to within 3 years, use OCLC, Josten's or Baker and Taylor cataloging services. These three sources for bibliographic information, each of which can potentially furnish such data in machine-readable form, may account for roughly 60% of all Colorado library acquisitions by 1979. The interesting point to note here is that most academic libraries expect to be using OCLC by 1979, but most public and special libraries do not. This difference can be explained, perhaps, by the comparison of costs for cataloging via OCLC as against purchasing cataloging from one of the commercial services. Catalog card sets may be purchased from Josten's and Baker and Taylor for $.30 - $.35,* as opposed to the $2.00-plus charge of OCLC. While OCLC is useful as a source of cataloging records for older and more esoteric materials, most public libraries are likely to find that the commercial services can meet their needs almost as well and for less cost.

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*For a good comparison of commercial cataloging services, see Sharon Scott's "Commercial Catalog Card Services" in Road Runner, volume 20, number 3, January 1977, Arizona Library Extension Service, pp. 14-26.

TABLE 1. SURVEY DATA FROM COLORADO LIBRARIES

Class (by acquisitions volume)	RLSS* Location	Cataloging ** Now			Cataloging ** 3 yrs			ILL (1975) Lent	ILL (1975) Borrowed
Largest: 35-70,000 titles acquired	4 - CC	OCLC	J	B&T	OCLC	J	B&T	600	400
1 Public	1 - HP	0	0	0	0	0	0	to	to
3 Academic		1	0	1	3	0	0	8,900	4,300
1 Special		1	0	0	1	0	0		
Large: 10-25,000 titles acquired	3 - CC; 1-SW	OCLC	J	B&T	OCLC	J	B&T	1.0	400
5 Public	2 - AV	0	2	3	?	2	2	to	to
5 Academic	2 - PP	1	2	2	4	1	0	17,500	2,600
0 Special	2 - HP	0	0	0	0	0	0		
Medium: 5-10,000 titles acquired	4 - CC; 1-TR	OCLC	J	B&T	OCLC	J	B&T	20	300
7 Public	2 - PA	0	4	1	2	3	1	to	to
3 Academic	2 - PP	1	1	1	3	0	0	11,800	3,300
0 Special	1 - HP	0	0	0	0	0	0		
Small: 1-5,000 titles acquired	22 - CC; 3-AV	OCLC	J	B&T	OCLC	J	B&T	0	10
19 Public	6 - TR; 1-PA	0	11	8	1	11	6	to	to
11 Academic	5 - HP; 1-SW	2	3	2	4	1	1	9,600	1,600
11 Special	3 - PP	1	2	0	6	1	0		
Smallest: 20-1,000 titles acquired									
20 Public									
2 Academic	} of libraries responding to survey								
24 Special									

*RLSS: Regional Library Service System within which a library is located, regardless whether the library is a member of the System. AV = Arkansas Valley; CC = Central Colorado; HP = High Plains; PA = Pathfinder; PP = Plains and Peaks; SW = Southwest; and TR = Three Rivers.

**J = Josten's; B&T = Baker and Taylor

The ILL column in Table 1, although the validity of the statistics reported is questionable, does point to some surprising imbalances among individual libraries within each class in the amount of their participation in interlibrary loan. The reasons for such imbalance are not known, but one cause may be the lack of a convenient title location capability showing the holdings of most of the larger libraries. Also interesting to note is the balance among the classes for the number of loans made; one small library has made as many loans as a large library, for example. This suggests that it may be important that the holdings of some small libraries be included in a title location tool. Taking this factor into consideration, we can identify a total of about 40 key Colorado public and academic libraries whose acquisitions should be included in a title location tool, at a minimum.

Turning to the amount of original cataloging performed by Colorado libraries in the medium or larger classes, the survey data indicate that, with the exception of five libraries, this activity represents less than 10% of the volume of acquisitions. This fact indicates that the need of state support for original cataloging for books is not a pressing one, particularly in view of the fact that more libraries in the future expect to move to OCLC or other shared cataloging service. In fact, looking at the five exceptions, one library will be installing OCLC in the near future, one has its own system in which original cataloging is not onerous, and three appear to make little or no use of existing catalog services. About 30% of documents and 60% of non-print materials acquired by Colorado libraries are originally cataloged; here, a means for sharing cataloging might be useful.

3.3 COLORADO LIBRARY DATA BASES

There are several major library data bases in Colorado. Most are circulation or inventory control files, such as the one at Penrose Public Library, Colorado Springs, but a few are catalogs, such as the one at Jefferson County Public Library (Jeffco).

The Jeffco catalog began as an acquisitions system in 1967, with the cataloging function being added in 1972. Thus, inputs to the catalog are normally derived as a by-product of ordering materials through the acquisitions system. Presently, the acquisitions/cataloging system supports a number of libraries and branches in the Central Colorado Regional Library Service System, and it is anticipated that coverage will be expanded to include all member libraries except Denver Public and its branches. There are 140,000 title records, (32,000 of which are for juvenile titles) in the data base; it is estimated that there are 360,000 titles in public libraries in the

system's area (outside of Denver). Academic libraries do not participate, but several special libraries and community college libraries may contribute to the catalog. Jeffco includes non-book materials in the catalog, but the other participating libraries do not.

Jeffco data base records are fixed length, with data truncated to fit: each of up to 3 author fields allows 57 characters, each of up to 3 title fields allows 140 characters, and each of up to 6 subject heading fields allows 57 characters. Subject headings are based for the most part on Library of Congress (LC) subject headings, but may be altered for better computer sorting. Only upper case characters are allowed, and no punctuation or special symbols are allowed, in general. The LC card number is not included in title records. However, an 11-character author/title search key is used, consisting of: the first 4 letters of the first significant title word, plus the first 3 letters of the second word, plus the first 2 letters of the third word, plus the first 2 letters of the author's surname.

Boulder Public Library has built a computer-based file for AV material which now contains about 2,000 entries. Records are complete in form except for the LC card number, which is being added. However, only upper case characters are used. The quality of this data base suggests that it might be used statewide as a source of cataloging data for AV materials not covered in MARC records. Boulder Public also has a small printed catalog produced by Science Press which lists about 8,000 documents in the Municipal Government Reference Center collection.

Denver Public Library is contracting with Auto-Graphics for a microfilm catalog for its collection.

At least four major Colorado libraries (Penrose Public Library at Colorado Springs, National Oceanographic and Atmospheric Administration Library at Boulder, the University of Colorado and Colorado State University) use a computer-based circulation control system, and several more libraries expect to do so within the next three years. The Penrose Public Library's inventory control system has been developed locally; most such systems now are being purchased from a vendor such as CLSI, 3M, or Gaylord. Nonetheless, the Penrose Public Library system appears to be well designed and ought to be looked at by any other Colorado librarian who is considering purchase of a system.

Currently, the Penrose Public Library data base contains 48,000 records for books, and input of new records is continuing at a rapid rate. The Library and its branches have a total of about 380,000 items of all forms, but not all will be represented by records in the system. Data elements in the data base records are: author surname, truncated to 10 characters; title, truncated to 50 characters; LC card number, 9 characters; Dewey class number, truncated to 10

characters; and other local control data. The LC card number was included specifically for the purpose of linking the control file records to bibliographic records in other data bases.

4. PURPOSE AND OBJECTIVES FOR A STATEWIDE DATA BASE

4.1 POTENTIAL USES FOR A STATEWIDE DATA BASE

At the beginning of the WILCO project the purpose of a statewide data base had been expressed in the preliminary needs statement of the June 1976 rough draft Colorado Library Networking Plan:

"Concerning the development of a union catalog for monographs, three particular library services were suggested as integral parts of such development. These are (1) cataloging, (2) interlibrary loan, and (3) acquisitions."

Each of the suggested services to be supported by the proposed union catalog data base would require its own set of objectives. For example, to support cataloging, the data base would have to contain complete and authoritative bibliographic records for almost all materials acquired by Colorado libraries, and be provided with a capability for producing catalog cards and labels. To support acquisitions, the data base would need an on-line updating capability and a complex of auxiliary processes for order writing, claiming, preparation of acquisitions lists, and perhaps accounts payable as well. But, to support interlibrary loan, the data base records would not have to be complete or authoritative, no on-line capability would be required, and few auxiliary computer programs would be needed

Union catalogs (including computer data bases in a library) can support four or five very different functions:

- Item identification (descriptive cataloging)
- Subject identification (subject cataloging)
- Title location identification
- Current volume location or status (circulation or inventory control)
- Acquisitions processing and control (order writing and in-process status)

Existing and near-future technology offer the prospect that the five functions can be performed more efficiently if they are separated rather than combined in one big system. For example, many public and special librarians have long recognized that short form or brief entry cataloging is sufficient to meet their item identification needs. As another example, many librarians rely for subject access to journal articles, documents and technical reports on citations provided by national abstracting and indexing services (e.g., ERIC,

NTIS, National Library of Medicine). A third example is the circulation control system in which only the data necessary to identify a particular item and its current physical location are stored. The time may come when libraries no longer maintain catalogs; instead, they would have inventory control systems and access by terminal to bibliographic files for author, title and subject searching, just as journal and document collections can be managed now.

Experience over the past 15 years with data bases developed to support all three of the suggested services demonstrates that such undertakings are difficult and costly. At the present time, only one computer system designed to provide statewide support for all three services is in existence: WLN. It is too early to tell how successful this system will be, when it might be available for use in Colorado, and how much it will cost. Various attempts have been made, including one in Colorado, to operate processing centers supporting at least acquisitions and cataloging. Most of these attempts have been unsuccessful when tried on a large scale. (They can work on a small scale, however, as illustrated by activities at Jefferson County Public Library, the High Plains Regional Library Service System, and the Nevada State Library's Cooperative Services Division.)

New technology and services in the library support market offer alternatives to the centralized processing or multi-use data base concepts. Minicomputer-based systems, although not currently offered for sale, are likely in the near future to provide support for acquisitions in the larger libraries where the need for such help is greatest. Cataloging services are readily available at a reasonable price from vendors such as Blackwell, Baker and Taylor and Josten's, and from two non-profit library services: OCLC (Ohio College Library Center) and BALLOTS (Stanford University).* Reviewing the data collected from Colorado libraries, it appears that most do not have a great need for a statewide data base that is designed to support cataloging (at least for books); most libraries do very little cataloging on their own.

These considerations lead to the conclusion that the main purpose of the statewide data base should be to support interlibrary loan by showing what libraries have a particular title (or kind of material) in their collection. Instead of a union catalog, this data base will be called a "title location file" in the remainder of this report.

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*An interesting comparison of Blackwell and OCLC services on a cost-benefit basis, concluding that Blackwell service might appeal to libraries with moderate acquisitions rates, is: R. W. Meyer and Rebecca Panetta. "Two Shared Cataloging Data Bases: A Comparison." College and Research Libraries, vol. 38, no. 1, January 1977, pp 19-24.

4.2 GOAL AND OBJECTIVES FOR A STATEWIDE TITLE LOCATION FILE

The overall goal of library networking is to assist patrons in gaining access to all the information resources they need so they are not limited to just the resources of their local library. Even if the local library happens to be a major research library, the rapidly rising expense and volume of published materials makes it impossible for any library to collect all the materials that its patrons may need. Networking is the organizational framework for providing the patron of one library with materials or information obtained from another library.

Clearly, if a library is to request material from another library it must have some means for finding out which of the 300-odd libraries in Colorado (exclusive of school libraries) has the item. (And, if no Colorado library has the item, then the next question is which of the 35,000-plus libraries in the United States and Canada might have it.) The basic objective for a statewide title location file should be to furnish information for materials in Colorado libraries, and the file itself should be supplemented with the organizational means for locating materials outside the state.

The problems currently besetting interlibrary loan suggest several objectives for a statewide title location file:

a) The file should reduce interlibrary loan costs by decreasing the amount of effort required:

- To locate a library having a specific item;
- To indicate exactly which item is wanted; and
- To prepare, transmit and process loan requests.

b) The file should reduce the number of loan requests that must be sent blindly to a library in hope that it may have the material wanted.

c) The file should reduce the time delay between a patron's request and receipt of materials through interlibrary loan. Most patrons requesting materials for informational (in distinction to recreational) purposes usually need them within one week.*

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*Far West Laboratory for Educational Research and Development. The Educational Information Market Study. Santa Monica: System Development Corporation, October 1976. Volume II, pp. IV-27-IV-29. Only about 25% of the respondents to this extensive information market study could usually wait longer than one week, yet ILL transactions average 7 days between local libraries, 12 days between libraries within the same state, and 18-22 days between libraries in one state and another.

d) The file should support better access by patrons to the whole set of library resources in the state. If it makes sense for taxpayers to pool their contributions to provide a local library, it makes sense for the same reasons to pool the resources of all libraries within a given geographic and political area to provide better service to those contributors.

4.3 NEED FOR A TITLE LOCATION CAPABILITY

Is there a real need for a title location file? The results of WILCO's Cost and Funding Studies investigating interlibrary loan patterns in the West indicate that there is.

"One can clearly conclude that the use of union catalogs among public libraries is not widespread, and that even among other [types of library] the use of union catalogs as sources of location information is limited. This is despite the fact that, among [survey] participants, union catalog citations yielded the highest fill rates: 76%...[to]...93%.... Further, it appears from the collected data that requests [not using a union catalog] have a far longer turnaround... ."*

Is a state-based list likely to be more useful than one encompassing a smaller or larger area? Except for large academic libraries' borrowing needs, the great majority of interlibrary loan requests remain within state borders: 78-96% depending upon type of library. Requests are fairly evenly divided between local libraries and libraries elsewhere within the state.** Evidently, the state is the most appropriate geographic unit for providing title location information, and this practical observation is reinforced by the fact of the state's political role as a major unit of government. This conclusion should not be viewed as denigrating the utility of multistate and national location tools; these are needed for backup for state resources.

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*Brown, Maryann K. and Anita L. McHugh. Survey of Costs in Technical Processing and Interlibrary Loan: Summary. WILCO, WICHE, Boulder, Colorado, December 1976. (#2B130, $4.00). p. 107.

**ibid, p. 83-84, Tables 50 and 51.

Because there is no existing statewide title location file covering more than a few libraries, the question might be asked why one is needed if Colorado has done without one up to now. Librarians have used an interlibrary loan mechanism for a number of years. This mechanism has been based on the willingness of librarians to loan their materials to other libraries and to absorb the costs for doing so. Location devices such as the National Union Catalog, the multi-state union card catalog at BCR, and directories describing the particular strengths of various libraries have provided some help in identifying which library might have an item that a patron wishes to borrow. Despite the skill and knowledge of interlibrary loan librarians employed by the larger libraries, and following the usual practice of librarians in smaller libraries, too often a loan request has to be sent to a large library blindly in the hope that a library that large ought to have the needed item. In fact, using data collected during WILCO's Cost and Funding Studies and ILL borrowing transactions reported in Directory of Colorado Libraries - 1976, it can be estimated that about 1/6 of the 75,000 requests received by Colorado librarians for non-serial items were for materials that they did not own. These wasted ILL requests cost Colorado libraries at least $31,000.

The current interlibrary loan mechanism is breaking down because of the increasing expense involved as loan traffic climbs and handling costs increase. Loan service, rarely rapid at best, is facing more imperative patron demands for faster delivery. More patrons are becoming aware that they can obtain materials from a library other than their own, and thus there is a tide of rising expectations. Some libraries are charging $5-8 per loan, and this adds another element of complexity -- and cost -- in deciding where to send a loan request. The cost of maintaining the BCR union card catalog has become clearly uneconomic, but there currently is nothing to take its place. For all these reasons, continuing to do ILL business in the same old way will result in an increasing waste of scarce dollar and people resources and a degenerating quality of library service.

4.4 CRITERIA FOR EVALUATING ALTERNATIVE METHODS FOR MEETING THE OBJECTIVES FOR A STATEWIDE TITLE LOCATION FILE

Before proceeding to look at ways in which a statewide title location file might be developed, it would be best to specify the set of criteria to be used in evaluating how well each method fits with the objectives described in Section 4.2. Each of the alternative methods to be evaluated has certain seductive aspects that might lead the reader to embrace it on the grounds of its inherent attractiveness, regardless how well or ill it may accomplish the main objectives for the statewide title location file. In considering the analysis of alternatives presented in Section 5, it may help the reader to refer

back to these criteria; if these are not agreed upon, then the evaluation of alternative methods may not lead to the optimal result.

4.4.1 Maximize patron and local librarian access to Colorado library materials, within an acceptable level of cost. The title location file should be capable of wide distribution or other means of access among Colorado libraries of all sizes. Librarians should be encouraged to make access to the file available in public areas.

4.4.2 Maximize interlibrary loan service potential in local libraries, at the service point closest to the patron. The title location file should provide the information needed for a local library to send a loan request (or refer the patron to) the "closest" library holding the needed item. "Closest" as used here is a measure of the likelihood of availability and speed of delivery, rather than being simply a measure of distance. This criterion suggests the desirability of including in the title location file the holdings of several libraries within each regional library service system.

4.4.3 Minimize redundancy with existing data bases. A state data base should not be a competitor to local data bases; instead, the state base should draw its inputs from local and other existing data bases without affecting their maintenance or use. Only bibliographic data not otherwise available should be keyboarded for entry in the state file. The state file need not include records found elsewhere, as in OCLC, unless it is cost-beneficial to do so.

4.4.4 Minimize costs for building, maintaining and using the title location file. Not only must data entry and computer operations costs be kept low, but also the amount of effort to make use of the file must be minimized. Where possible, the file should support the substitution of patron labor for librarian labor (so long as the patron is not inconvenienced thereby). Not only is patron labor "free" but also the patron is the one usually who knows best what is wanted. The more the patron can do for himself, the less chance there is for patron-librarian communication problems that result in the patron not receiving what he needs. The file should also provide sufficient bibliographic information so that a library receiving an ILL request need not verify the citation.

4.4.5 Minimize impact on local libraries contributing data. Input procedures should make it as easy as possible for local libraries to indicate what materials they hold, and to change the file to reflect

losses and withdrawals. The file should support interlibrary loan policies that may be developed to reduce inequitable lending burdens on a particular library.

4.4.6. Maximize flexibility so that the title location file can easily and inexpensively be adapted to changing technological and organizational conditions. For example: the file should be suited for use with an on-line computer system; the data should be suited to serve as input to regional or national files; and the file should provide for a potential linkage with local circulation control systems.

5. EVALUATION OF ALTERNATIVES

There are three major alternative methods that could be used to provide a statewide title location file for Colorado:

- A union card catalog
- An on-line method using OCLC or BALLOTS
- An off-line method using a state-maintained data base from which listings can be distributed on microfiche.

A fourth alternative that should be considered is a directory. The Colorado chapter of the Special Libraries Association publishes a Directory of Specialized Colorado Library Resources which is a useful guide to the subject strengths of special libraries. Much library material, particularly the non-book materials that are assuming increased importance as information sources, cannot cost-effectively be treated on a title-by-title basis. Location information for such materials can most appropriately be provided in the form of a directory. However, the majority of loan requests are for a specific title, and accordingly a directory could not greatly increase the overall efficiency of interlibrary loan. A directory is a necessary, but not sufficient, method for improving access to Colorado library materials.

5.1 UNION CARD CATALOG

Several regional library service systems maintain small union card catalogs representing at least some of the holdings of member libraries. A major location tool for Colorado libraries is the multistate union card catalog maintained by BCR which represents the holdings of libraries which have contributed cards for more than 1.5 million titles.

Although it is easy and cheap for libraries to contribute data to a union card catalog by simply sending in an extra copy of the main entry card, there are a number of serious drawbacks to continued reliance upon BCR or other union catalogs. Because a card catalog cannot be duplicated cheaply, it can be searched only at a central location. A requesting library must therefore carefully verify the bibliographic citation for an item prior to making a request for location information. This verification step is a costly procedure in many libraries, and the time taken to send and receive the location request significantly increases the time it takes to deliver the desired material to the patron.

Because the union card catalog contains main entry cards only, requests by title or subject cannot be handled easily. Extra work and cost are incurred by the requesting library or the agency that translates the title or subject request into a main entry citation. A library's patron has virtually no opportunity to find out what materials are available on a particular subject and so can contribute little to the translation process.

Maintaining a union card catalog is a labor-intensive operation whose cost is increasing steadily. For BCR, the current cost of maintenance is in the neighborhood of $4.00 per location request, and this figure does not include the handling costs for requesting and receiving the location information. BCR charges an extra $3.00 for handling a location request within 48 hours. The cost to BCR for maintaining the union catalog is so high that it is likely that the catalog will be closed in the not-too-distant future. In the meantime, cards received over the last two years have not been incorporated into the main catalog.

For the foregoing reasons, the union card catalog is not a viable alternative for a Colorado title location file, and the alternative need not be evaluated further.

5.2 ON- AND OFF-LINE METHODS

As pointed out in Section 3, most larger academic libraries, several special libraries, and a very few public libraries in Colorado use, or expect to, the OCLC on-line cataloging system. As a byproduct of cataloging with OCLC, location information is automatically included in the data base and is available to any library with an OCLC terminal. More than 800 libraries in the country use OCLC and the file has therefore become a major national resource for location information.

There are several drawbacks, however, to the utility of OCLC for a Colorado title location file. The most serious is OCLC's lack of a subject searching capability as well as other useful access points such as title key word. These capabilities are offered by other on-line systems such as BALLOTS and WLN. BALLOTS has yet to gain widespread use and therefore its data base doesn't contain much title location information of value to Colorado libraries. WLN is not yet available outside the state of Washington, and even if it were it would have the same drawback as BALLOTS. Nevertheless, it would be possible to make use of BALLOTS (the same terminal used for on-line reference service can be used to access BALLOTS) when its powerful searching capabilities were needed, then go to an OCLC terminal to obtain location information.

Another drawback to OCLC is the fact that Colorado libraries have begun using the system only within the last year, and thus it will be several years before a substantial amount of Colorado location information can be built up. There is no convenient way in which location information could be added separately to the OCLC file.

As pointed out earlier, many libraries may find the expense of using OCLC for their cataloging to be a barrier. Public and school libraries can satisfy their cataloging needs more economically through a commercial vendor, and smaller academic libraries do not have sufficient volume to warrant OCLC's cost. Even if the state were to subsidize key public libraries so they could afford to use OCLC, patron access to Colorado library resources would be only partially improved. The OCLC system is sufficiently difficult to use that many patrons would need a librarian's assistance in looking up items in the OCLC file. Further, it would be awkward to have to use the same terminal for both cataloging and searching; large libraries would need to install an OCLC public service terminal at a cost of $2500 per year.

A growing number of libraries are turning to commercial computer-based services that produce their catalogs on microfilm or microfiche. These services make use of MARC records and other catalog records contributed by their customers. The microform catalogs can be duplicated very cheaply, and so can be distributed to branch libraries and other locations for use by patrons and local librarians. As many access points as desired can be accommodated, and the microform catalogs normally have author, title and subject divisions. Several groups of libraries use a microform union catalog in place of a card or printed union catalog.

A variation on the microform catalog is the numeric register. This is a simple and cheaply produced list of LC card numbers and codes for the libraries holding the corresponding titles. Numeric registers are used in Louisiana, Texas and Arizona to improve inter-library loan services and reduce costs among the state's libraries. Because the numeric register can help only when the LC card number for a title has been obtained, it must be used in conjunction with a catalog to find the title itself. Many Colorado libraries do not include the LC card number in their catalog, and a numeric register might therefore have only limited value.

The major drawback to the off-line method for a title location file is the fact that the cost of maintaining the data base and publishing new listings from it steadily increases as the size of the file grows. Within 10-15 years, a crossover point may be reached at which on-line access from most libraries would be cheaper than continuing to distribute off-line listings.

Another drawback to the off-line approach, as compared to the use of OCLC, is that the file would not contain the wealth of location information that the OCLC file has. This can be at least partly alleviated through providing access to OCLC on a back-up basis. Each regional library service system, except Southwest, has at least one library that is, or soon will be, an OCLC user. Arrangements could be made with one or more OCLC users in each area to perform an OCLC search upon request if no location for a title were listed in the state title location file.

A major advantage of the off-line method is that it can combine bibliographic data from a number of different sources into a single file. With little human intervention required, it would be possible to merge into one file data from OCLC, Auto-Graphics, Baker and Taylor, Josten's, and local Colorado files such as those at Penrose Public Library in Colorado Springs and Jefferson County. This feature provides a high degree of flexibility while avoiding infringement upon a local librarian's responsibility for selecting the most appropriate means of doing the cataloging for that library.

5.3 COMPARATIVE EVALUATION OF CURRENT LOCATION CAPABILITY WITH ON- AND OFF-LINE METHODS

At this point, we can summarize and compare three alternatives for supporting Colorado interlibrary loan by providing location information for specific items of library material. The criteria presented in Section 4.4 will be used for this evaluation and comparison of the alternatives. The three alternatives are:

a) The current method, by which librarians use whatever location tools are available to them or send a loan request to a SARC or other library likely to have the item needed.

b) The on-line method, by which a few key academic and public libraries would utilize OCLC to find locations for items requested by other libraries.

c) The off-line method, by which a microfiche listing of new acquisitions by key Colorado libraries would be distributed to most libraries. A few designated libraries using OCLC for their cataloging would provide backup assistance in finding locations for materials not on the microfiche listing.

Maximize Patron and Local Librarian Access

Current Method: Patrons and local librarians have little capability in most libraries to find out what materials are available in other libraries.

On-Line Method: Access by patrons and librarians in libraries not using OCLC would not be improved. In libraries with OCLC, librarians may have improved access, but few if any patrons will be able to use the OCLC terminals.

Off-Line Method: Patrons and librarians in most Colorado libraries will have greatly improved access to location information for Colorado library materials.

Maximize Interlibrary Loan Service Potential in Local Libraries

Current Method: A patron's request may be sent to several libraries before it can be filled. Not only is the message handling costly (particularly if a location must be requested from BCR), but also the time necessary to fill the request is lengthy.

On-Line Method: Waste of time and effort caused by sending requests to libraries not having the requested material can be avoided. Otherwide, the message-handling chain is essentially the same as for the current method, with a requesting library (or public service department within a large library) having to send the request somewhere else before a location can be identified.

Off-Line Method: The requesting library can send the request (or the patron) directly to another library that has the needed item. This direct routing reduces the time and cost wasted by going through intermediate libraries.

Minimize Redundancy with Existing Data Bases

Current Method: The problem is more one of fragmented, rather than redundant, sources of location information.

On-Line Method: Minimal redundancy because the OCLC data base is the primary source used for location information.

Off-Line Method: There would be some redundancy because data are merged from several sources into one file, but there would be no need to build a data base from scratch that would be competitive with existing data bases. The off-line file need not include Colorado OCLC data if on-line backup is satisfactory.

Minimize Costs

Using data in the WILCO Cost and Funding Studies Summary and the Directory of Colorado Libraries-1976, and making a number of assumptions, it is possible to compare the costs for each of the methods. The comparison is admittedly shaky because the calculations are sensitive to error in the statistics used and the assumptions made. Nevertheless,

the results of the exercise, whose details are shown in Appendix A, are perhaps surprising: each method costs approximately the same as the others.

Minimize Impact on Local Libraries Contributing Data

Current Method: Most libraries do not contribute location information to any source; those that do, do so by sending in an extra copy of the main entry card for new acquisitions. Because the holdings of most libraries are not known to other libraries, ILL requests are sent to a few key libraries who have agreed, explicity or implicity, to act as resource centers. Many libraries make very few loan requests, for one reason or another; one reason may be that their patrons have no idea of what materials might be available outside their own library's collection.

On-Line Method: Holdings information is included in the OCLC file automatically as a byproduct of cataloging. Libraries using OCLC will be the focus for ILL requests as a consequence of having their holdings shown. Certain public libraries may be required to use OCLC when they might otherwise have used commercial cataloging services.

Off-Line Method: Location information can be contributed by sending in a copy of the main entry catalog card. ILL requests may be distributed more evenly as the holdings of more libraries are shown. The total volume of ILL may increase significantly, particularly if availability of the title location file is advertised to patrons.

Maximize Flexibility

Current Method: Not applicable.

On-Line Method: Colorado would become almost wholly dependent on OCLC to obtain location information. If some Colorado libraries were to use BALLOTS or WLN for cataloging, it would be necessary to search those files as well for locations.

Off-Line Method: Maximum flexibility, with the ability to use virtually any data source and to transfer the state data base to many different computer systems.

This comparative evaluation of the three alternatives demonstrates that the off-line method meets the objectives for a statewide title location file better than the current or on-line methods do. The off-line method is the only one that directly assists the library patron to discover what materials are available in the state and offers a potential for substantially reducing the time for obtaining those materials through interlibrary loan.

5.4 RECOMMENDED: AN OFF-LINE COMPUTER-BASED TITLE LOCATION FILE, SUPPLEMENTED WITH ACCESS TO ON-LINE FILES AND A DIRECTORY OF SPECIALIZED RESOURCES

The Colorado State Library should establish at the earliest opportunity a title location data base containing location information for recent acquisitions by the 25-30 key libraries of all types in Colorado that do not use OCLC for cataloging. Initially, the data base should reflect the content of at least the Jefferson County Public Library catalog file, to provide an immediately useful scope of coverage, and should perhaps include the content of the Penrose Public Library in Colorado Springs inventory control file as well. The state title location data base should thereafter incorporate location information for at least the new acquisitions of key Colorado libraries (not using OCLC), and coverage can be extended to older materials as seems desirable based on the kinds of ILL requests that are made. All types of library material other than serials should be included in the title location data base.

Listings of the data base, and of recent additions, should be distributed to most Colorado libraries (except those in elementary schools) on microfiche and on a frequent basis. The listings should provide for access to materials and their locations by author, title and subject.

Whether the state file should include holdings of Colorado libraries using OCLC or BALLOTS is open to question. Within three years, approximately 40% of the books acquired by Colorado libraries may be cataloged with the aid of these systems. The systems could provide duplicate records on magnetic tape for the cataloging done by a particular library (e.g., OCLC's "archive tapes"), and the records could be merged into the state's own file. However, there would be some amount of cost ($2,000-$3,000 in the first year, and rapidly increasing thereafter) to purchase the tapes and perform the merge operation.

There is a natural separation between public and academic libraries; each type tends to operate in a separate informal network, turning to another library of the same type when needing to borrow materials. The academic libraries are in the process of becoming an OCLC-based network, and the exclusion of their holdings from a state title location file might put neither the public nor the academic libraries at a serious disadvantage. On the other hand, the academic librarians themselves may find that using a microfiche listing is more cost-effective than on-line searching for location information via OCLC, particularly when a subject search is needed. There may also be more demand on the part of the general public for materials likely to be found in academic collecitons than is now suspected. It is

therefore recommended that, initially, the Colorado State Library arrange for acquiring OCLC archive tapes for newly cataloged materials in Colorado libraries, and that the OCLC information be merged into the state title location data base. After a year or two, during which time detailed data showing ILL traffic patterns have been collected, a special study should be performed to answer the question of whether or not the OCLC information should continue to be included in the state file.

It is also recommended that each regional library service system arrange with one or more OCLC-using libraries in its area to provide location information for titles not found on the state title location list. This location information backup service should include OCLC searching, access to BALLOTS for subject, title key word, and other specialized searching, and access to citation data bases for identifying non-book materials.

Some kinds of library material can better be handled on a collection basis than on a title-by-title basis. For example, a collection of ERIC documents need not be included in the state data base on a title-by-title basis because it is sufficient to know that any ERIC document can be found at a particular library. (Author, title, and subject access to ERIC are provided by the manual index Resources in Education (RIE) and by on-line search services offered by vendors.) Similarly, a local history collection, which might contain photos, news clippings, manuscripts, and similar materials, could be listed in a directory of specialized resources rather than in a machine-readable file. This directory should be compiled primarily by the regional library service systems, with the assistance of the Colorado Library Association and the Colorado chapter of the Special Libraries Association, with editorial coordination provided by the Colorado State Library. The editorial office at the State Library should continue in existence after publication of the first edition to receive comments and changes and to conduct an evaluation of the directory's usefulness in terms of coverage, format, and effective employment as a location tool. A second edition will probably be required after two years. It might be worthwhile to make the investment in computer support for preparing at least the directory's indexes, and perhaps for full scale text editing as well, because of the need for revision and republication.

There may be a need for a state cataloging data base, distinct from the title location file, to fill a gap in the national bibliographic system where standard cataloging information is not available for some types of document and non-print materials. COIN, the Colorado Index of state documents, for instance, might be the start for such a data base. The Boulder Public Library's data base for non-print materials could also be included in a state cataloging data file.

As a final recommendation, the Colorado State Library should undertake an initial and an ongoing study of Colorado interlibrary loan traffic patterns and costs. The initial study should be aimed at providing a baseline estimate of current ILL costs, volume of activity for all types of libraries, kinds of interlibrary loan requests, and traffic patterns for the flow of requests and materials. The baseline estimate may then be used to measure the effect of changes in ILL procedures and the availability of a better title location capability, as indicated by the ongoing study of Colorado ILL. A subsequent detailed study should be scheduled about two years after the introduction of the state title location file to determine whether OCLC information should be included and what older materials are still in demand and so should have their locations added to the file. The instruments used in the WILCO Cost and Funding Studies could be adapted to collect the necessary data.

5.5 NETWORKING STRUCTURE FOR EFFECTIVE USE OF THE TITLE LOCATION TOOLS

Effective use of these recommended location tools requires an appropriate structure for carrying out interlibrary loan among the state's libraries. Figure 1 illustrates such a structure, and is based on recommendations being presented in the draft Colorado Library Network Plan. At the local library level, both patrons and librarians may make use of the title location list and the directory of specialized resources to assist them in locating materials not in the local library's collection. ILL requests can be sent directly to a library shown to hold the material desired. (On the ILL request, the desired item should be identified by its title and the LC card number or similar standard title identifier rather than by the traditional full bibliographic description. Not only will this cut down the time and cost for preparing and transmitting the ILL request, but also it will reduce the need for reverification on the part of the library receiving the request.)

Should additional help be needed in locating wanted material, the local library (if not an OCLC user) can request assistance from the OCLC-using library providing backup service for the regional library service system. (Non-member libraries might make use of this service through contracts or other formal procedures.) The backup library can search the various national on-line bibliographic files, or use traditional location tools such as the National Union Catalog and Register of Additional Locations, or send a location request to BCR. The library should be a switching center to transmit the ILL request to the appropriate holding library, rather than follow the more expensive and time-consuming procedure of sending the location information to the local library.

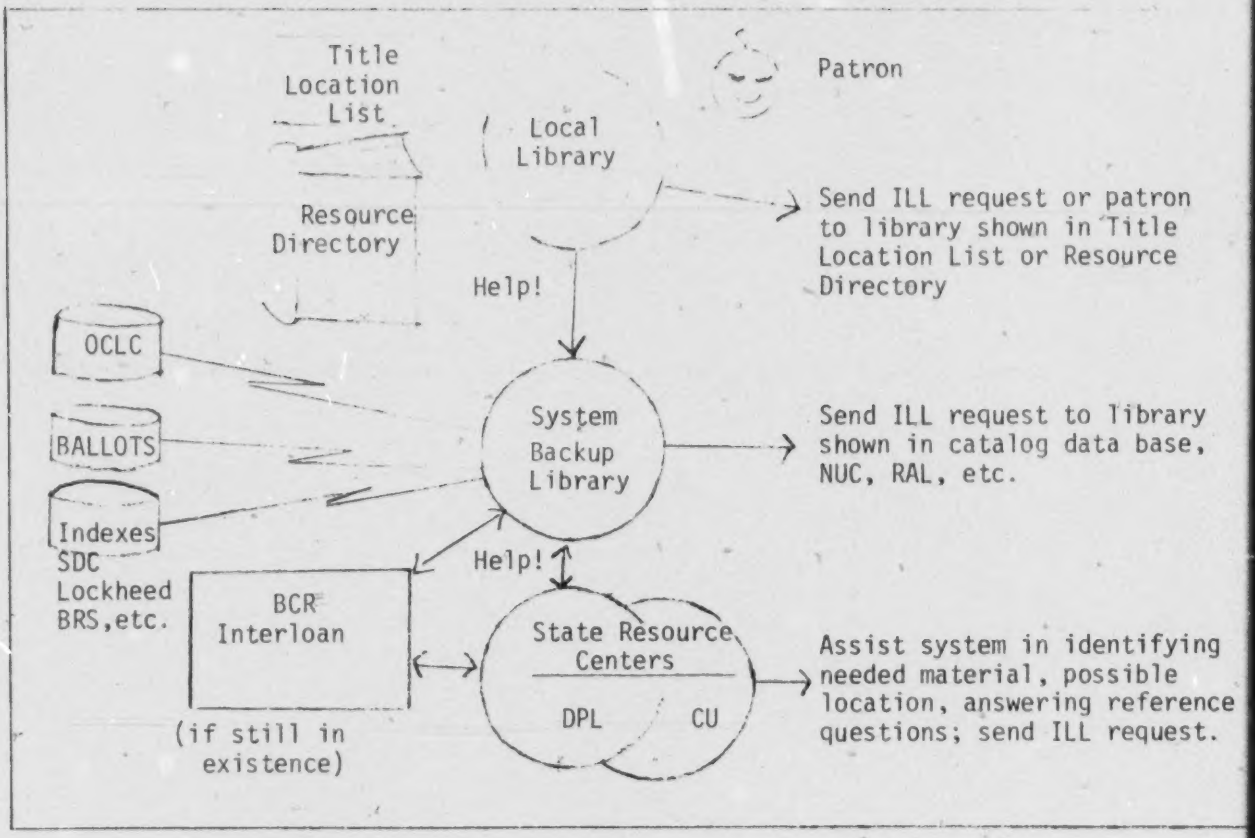

Figure 1: Organizational structure of the Colorado State Library Network which the Statewide Title Location List should be designed to support.

Assistance for really thorny location problems can be obtained from two State Resource Centers: one for academic libraries (to be established at the University of Colorado at Boulder or other major institution) and one for other kinds of libraries at Denver Public Library. The Resource Centers also serve as message switching points in dispatching ILL requests to the appropriate libraries, with instructions that the requested material is to be shipped to the local library.

This kind of distributive structure enhances a local library's capability for providing service to its patrons, in distinction to an hierarchical structure with a lengthy communication chain interposed between the patron and the information or material sought. But the distributive structure also provides the means for centralizing into a "critical mass" the persons with specialized skills and knowledge, and equipped with specialized location tools, who can provide most effective assistance directly to the local librarian and patron.

6. FUNCTIONAL SPECIFICATIONS FOR THE STATEWIDE TITLE LOCATION FILE

This and the following sections deal in some technical detail with the design and development of the recommended statewide title location file. Although these sections may make difficult reading for the non-technical person, they offer information that answers specific questions that you may have at this point.

The functional specifications are deserving of full understanding because these tell the people who must build the file and the computer programs to manipulate it exactly what it is that you want. Furthermore, the specifications allow you to prove that what the programmers and data base builders deliver is (or is not) exactly what you asked for.

6.1 ASSUMPTIONS

Given the goal and objectives for a statewide title location file, there are several assumptions underlying the following functional specifications. The first assumption is that location information should be provided for all kinds of library materials, but not for all individual items. Some materials can be treated more cost-effectively as a group (i.e., a special collection), and so should be covered in a directory. Use of older materials in most (but not all) fields of knowledge declines rapidly; data from the WILCO Cost and Funding Studies indicate that materials published within the last seven years will satisfy the majority of interlibrary loan requests. The title location file should therefore include only those older materials that are still in active use.

Bibliographic data in the file need not be as complete or accurate as the data needed for cataloging. MARC records should be used when available, but when they are not, as for some non-book materials, then the bibliographic descriptions compiled by local catalogers should be quite acceptable. Although authoritative forms for names and subject headings are desirable, non-authoritative forms can be used without greatly affecting the title location file's utility.

In the first year or two, while the size of the file is relatively small, it will be better to include records for as many materials as possible. Later, it may be necessary to exercise tighter control over what records are added and what records should be left out.

Listings produced from the file should be designed for use by library patrons. This will reduce the load on the librarian in assisting patrons and will increase the patron's ability to obtain exactly the materials wanted.

As a final, but most important assumption, the statewide title location file would be only a tool for librarians and library service to patrons. Creation, maintenance, and use of the file depends more on the commitment of Colorado librarians to cooperation than on the narrow technical details of data entry, computer file management, and list production. It is up to both the formally established networks of the seven regional library service systems and the informal networks among libraries of the same type or in the same locality to put the statewide title location file to effective use. The availability of the title location lists will likely raise some thorny issues respecting inequities between libraries that have healthy budgets for purchasing materials and those that do not, and between libraries that are net-lenders and those that are net-borrowers. Resolution of these issues may sorely test the commitment of Colorado librarians -- and their funders -- to better library service.

6.2 SPECIFICATIONS

There are a number of functions that the title location file should be designed to fulfill or support. These functional specifications provide the guidelines on which system and computer program specifications must be based, and by which the performance of the program and system should be evaluated. As used here, "system" means the whole organized set of data bases, computer programs, published title location lists, agencies administering the maintenance and use of the information, and the users of the information.

6.2.1 Include holdings for all key libraries in Colorado. Key libraries are defined as those libraries having a relatively large collection, or particular collection strengths, that can satisfy a large proportion of the interlibrary loan demand. Each regional library service system has at least one public and one academic library that can be designated as a key library. Tentatively, 19 public and 21 academic key libraries have been identified.

6.2.2 Allow inclusion of holdings for other libraries wishing to participate in the statewide title location list. There are about 1,400 libraries in the state. Most (1,040) are school libraries which, except for high schools, probably do not need to be included at this time in the state title list. This leaves 350-400 libraries in addition to the key libraries which might potentially be included in

the list. Because many of these libraries are very small, it is likely that the actual number of additional contributors will be around the 150-200 mark at most.

It is desirable to include holdings for libraries other than the key libraries in each regional library service system. As the findings from WILCO's Cost and Funding Studies indicate, the speed with which an interlibrary loan request can be filled by a library in the vicinity of the requester is almost double that when the lending library is outside the local area.* Furthermore, it is desirable to spread the burden of interlibrary loan among a wide base of libraries rather than concentrating demands upon a few libraries -- which still have their own patrons to serve.

6.2.3 Include all kinds of materials, except serials (which should be handled in a different manner). Modern library service is based on many kinds of materials, and the title location file should reflect this fact. It is difficult to find a technical report or government document, and non-print materials (except for circulating films) are rarely locatable.

6.2.4 Provide the most useful data and access points to the machine-readable file. As a minimum, access by title, author (composer, performer, etc.), subject heading and LC card number will be needed. Other access points such as title key words, form or medium, or publication date should be included if an on-line search capability is provided (but on-line searching is not a requirement at this time).

The following data elements are needed for records in the machine-readable file:

(1) Library of Congress card number (or other standard title identification such as an ED, PB, or AD number for technical reports). This element is required for every record. A pseudo LC card number or other identifier must be assigned for titles lacking a standard identifier; it would be preferable to establish a regional or national registry for such assigned identifiers. A clearinghouse is being established by the American National Standards Institute Committee Z39 on library and related practices to maintain such a register. The ANSI/Z39 Secretariat is located at the School of Library Science, University of North Carolina, Chapel Hill, NC 27514.

(2) Title and added titles. This element is required for every record.

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*op cit. p. 86, Table 53.

(3) Author or other personal or corporate names associated with the item.

(4) Subject headings, as established by the Library of Congress and other national or state authorities.

(5) Year of publication. This element is needed potentially for removing older records from the active file, and (particularly for technical materials) provides users with a clue to the currency of the information in an item.

(6) Medium (or collation). Because the file will contain different kinds of materials, users will need the capability to request or exclude materials of specific kinds. A collation statement is also useful in estimating an item's suitability to a particular information need (e.g., if only a little information is needed, a user might not want to borrow a 500-page document).

(7) Location identifiers. A location identifier should be a short code to specify the library to which an interlibrary loan request should be sent for the title listed in the record, and not necessarily the library, branch, special collection, etc., where the item is physically located. (It is likely that in the future the physical location for items within a library system will be subject to frequent change as circulation control or inventory systems are installed to keep track of locations.) Although a standard coding scheme for location identifiers has been proposed to the TESLA (Technical Standards for Library Automation) committee of ALA's Information Science and Automation Division, there is currently no generally-accepted scheme. Location identifiers should designate the geographic area in which a library is located, both to facilitate selection of a lender that is "close" and to provide a capability for automated interlibrary loan message switching and loan flow pattern analysis in the future.

(8) References. A capability for providing "see" and "see also" references is required to aid users in finding the appropriate name or subject under which titles are listed.

Library call numbers were considered as an element that could be included in the title location file so that a lending library could go directly to the shelf to find a requested item, and avoid looking in its catalog. However, inclusion of this element would greatly increase the cost for data input and the size of output listings. Special and somewhat costly programming would be necessary

to allow modification of the element if a library needed to change or correct call numbers. On the other hand, inclusion of the LC class number would allow production of a classed title list, possibly useful for browsing.

6.2.5 Provide outputs that are cheaply produced and easily used. Listings of the state's machine-readable data base should be output by means of the computer-output-to-microfilm (COM) technique and be distributed in microfiche form. A high proportion of Colorado libraries have a microfiche reader, and microfiche is cheap to produce and distribute as compared to printed lists. Although microfiche is harder to use than hard copy (printed) materials, there is an increasing degree of acceptance of that form, especially among younger patrons. The directory for specialized resources, not likely to need frequent revision, may be produced in printed form.

The format for entries for both the microfiche listings and the printed directories should be designed for legibility and ease of reading. In general, it is best to include all information in each entry rather than to print the entry only once and refer to it from other access points. However, the list of title identifiers (LC card numbers, etc.) may be produced as a one-line entry, with the corresponding title truncated. For readability, upper- and lower-case characters should be used, but diacritics are not needed.

6.2.6 Provide statistics for control and evaluation. Production statistics such as number of records and number of locations added per time period, total file size, computer processing time, etc. are required for management of the title list file maintenance operation. A measure of overlap among collections of various sets of libraries may be useful in making decisions with respect to cooperative collection development. Statistics derived from sampling interlibrary loan activity will need to be compared occasionally to statistics respecting the content of the title location file to measure, for example, whether or not borrowing requests are being sent to the most appropriate libraries.

6.2.7 Allow frequent updating and republication. The title list file should be capable of daily update and at least quarterly republication as a new and complete cumulation.

6.2.8 Accommodate expected volume of activity. The file management system used for the data base should be capable of adding up to 200,000 title records per year, and up to 800,000 locations (additions, changes, and deletions). A title record must accommodate up to 900 locations, although most records will have only a few locations.

6.2.9 Accuracy tolerance. Bibliographic data in a record should be accurate within the constraint imposed by the criterion of minimizing cost. A relatively lenient tolerance is acceptable because the overall effectiveness of the title list will not be seriously impaired by erroneous bibliographic data. A prime potential source of error is the LC card number, which may be transcribed or keyboarded incorrectly. (The LC card number does not have a check digit.) As a verification device, bibliographic records should include an author/title key (as used by OCLC) generated automatically when a title record is added to the file, or input together with the LC card number when specifying a record to which a change is to be made. Transactions for which the LC card number and author/title key do not match must be flagged for examination and possible correction.

Other sources of inaccuracy may be the misspelling or use of different forms for author names and subject headings. These must be identified through inspection of the output listings. Correction should be made only as time is available, but cross references ("see also") may be added to the file if more convenient.

6.2.10 Provide a file segmentation capability. Eventually it will be desirable to retire records for older materials to reduce the size of the active file. It may also be necessary on occasion to produce a file of titles held by one or more specified libraries. Each file segment must remain available for continued maintenance because holdings data will continue to change over time.

7. DESIGN OVERVIEW FOR STATEWIDE TITLE LOCATION FILE

7.1 COST FACTORS TO BE CONSIDERED

There are three major cost factors for a computer-based file. The first (and most obvious) factor is that for file access, or display of the information on file. On-line access tends to be most economical when potential file users are few in number (hence only a few terminals are needed) and located near the computer (hence the costs for the telecommunications link between terminals and computer are low). But title location information will be needed by 200-300 libraries around the state, and thus the on-line approach would be expensive. It will be more economical to publish the file contents periodically on computer-output-microfilm (COM). A 3-4 month delay in the currency of location information will not much affect the information's value because most ILL requests are for materials published prior to 6 months ago. Microform publication is far cheaper than printed copy, although admittedly harder to use.

The second major cost factor for a computer-based file is the investment made for system development. Not only must special computer programs be written, but also design specifications must be written, acceptance tests must be run, training must be provided to users, and program "bugs" must be corrected. Development cost can be reduced by minimizing the complexity of the system required. Complexity must be balanced against the benefits obtained thereby; in general, the cost-benefit function is maximized when the degree of complexity lies in the middle ground between simple file operations and sophisticated interactive operations with extensive procedures for handling exceptions to the normal flow of data. Therefore, the program for a statewide title list should operate primarily in off-line mode (although data entry or correction might be done on-line) and a minimum of exception handling routines should be provided. This means that data errors or authority inaccuracies can be accepted so long as they do not significantly impair the utility of the location list.

The third major cost factor is for the input of data. As a general rule, it is cheaper to rekey short records rather than to transfer such records from a separate computer-based file, particularly when some inaccuracy can be tolerated. Although advantage should be taken of the availability of the MARC and other bibliographic records, extensive efforts need not be made to avoid keyboarding. There are many alternative methods for data input, most of which are dependent upon the particular capabilities and pricing schemes offered by a specific computer center, and the functional specifications described in Section 6 offer a guide for picking the best methods for inputting data to the title location file.

7.2 OVERVIEW

Figure 2 illustrates the general concept for maintaining the state data base for producing the statewide title location list. Location data for input to the file comes from two sources: (a) information contributed by participating libraries for their new acquisitions, furnished as extra copies of their catalog cards or accession lists; and (b) bibliographic records in machine-readable form representing additions to local library data bases (e.g., Jefferson County, Penrose Public Library in Colorado Springs, and Denver Public Libraries) or received from major vendors (e.g., Baker and Taylor and Josten's) representing materials purchased by Colorado libraries. Location information is added to data base records for the corresponding titles; if there is no record for the title on file, a MARC record is purchased from a vendor or utility (or the data can be keyboarded for input, if non-MARC). Periodically, the data base is sorted by title, author, subject and LC card number to produce listings on microfiche showing the holders of each title.

7.2.1 Input Processing for Contributed Location Information

Four elements are needed for inputting location information records: (1) the library identifier; (2) the title identifier; (3) an author/title key for that title; and (4) an indicator that the location is to be deleted (the absence of this element indicates that the location is to be added). Location information for each contributing library should be handled as a separate batch, with the library's identifier listed in the header record of the batch (so it need not be keyboarded again for each title). If there is no title identifer provided by the contributor for a particular title, the element may be left blank (or, if variable length record structure is used, coded to show that the identifer is missing). The author/title key can be used as a substitute or as a cross-check for a title identifier; it should be constructed in the same manner as used in the OCLC system. Contributors should be encouraged to provide title identifers (LC card numbers, or ED, PB, or AD numbers for documents distributed via ERIC and NTIS), but these may not always be easily found. There will also be materials for which there is no standard identifier; in such cases, it will be necessary to have the file maintenance system assign a pseudo identifier. It will be desirable to coordinate the format and assignment of pseudo identifiers with other states or library networks maintaining a title location file.

If the title identifier is present in the input record and matches an identifier or a title record in the file, then the library identifier from the batch header record is added to the location element

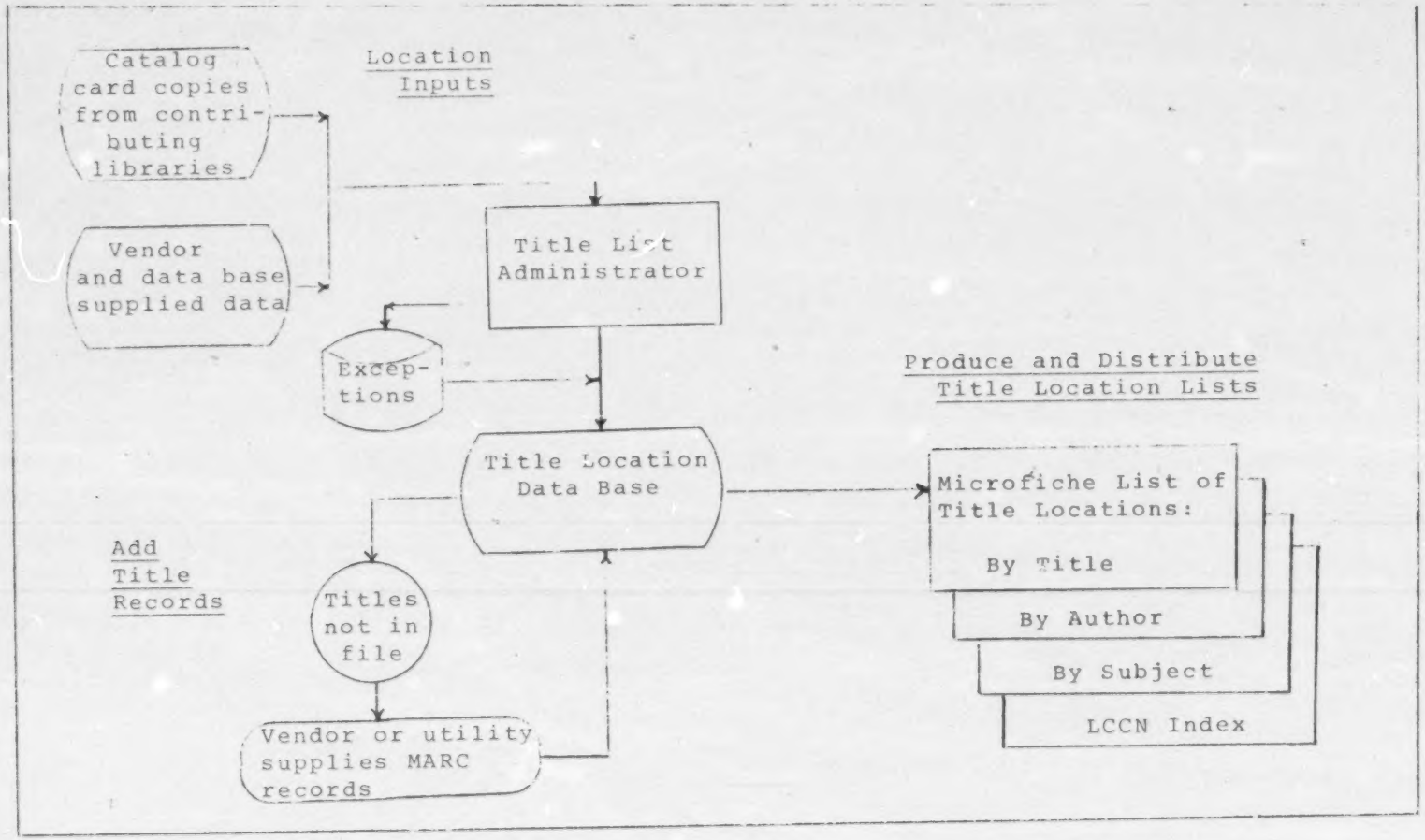


Figure 2. Schematic overview for entry of title and location data for the Statewide Title Location List, and production of fiche listings.

of the title record (unless already present), or deleted therefrom if the deletion indicator element is present. Should one or more of these conditions not be met, the exception must be reported for subsequent action by the Title List Administrator. Figure 3 illustrates processing of contributed inputs and the handling of exceptions.

There are three catagories of exceptions, and they will result in three error lists and associated files produced during input processing. First, there is the No Match List for input location information records where neither the title identifier nor the author/title key match an identifier-key combination in any title record in the data base. Entries on this List must have title records established for them in the data base, either by keyboarding the necessary bibliographic data or by obtaining MARC records from which the necessary data can be copied. Note that if non-MARC data are to be added, it may be necessary to assign a pseudo identifier for the title. Note also that if the input record called for a deletion, then the input can be ignored as it calls for deleting a non-existent record. Each record on the No Match List and associated error file should contain the elements: library identifier, title identifier, and author/title key.

The second exception list is the Possible Match List for input records having no title identifier given but whose author/title key matches that of one or more title records in the data base. The List should provide the library identifier and author/title key elements, as well as the title identifier and bibliographic data in each data base record whose author/title key matches the one input. The computer file associated with this List (as well as for the Mismatch List described below) should be a replica of the batch input file in structure, and should be accessible via an on-line editing terminal for ease in making corrections. The Title List Administrator can determine from the information provided on the Possible Match List whether one of the title records in the data base is the one to which the input location information should be added (in which case, the Administrator must insert the proper title identifier in the saved input record) or if a new title record should be established through keyboarding the bibliographic data or requesting a MARC record.

The third exception list is the Mismatch List for input records containing both the title identifier and author/title key elements where either fails to match a title identifier-author/title key combination for any record in the data base. On the List, the input record elements library identifier, title identifier and author/title key should be given, followed by (if the title identifier failed to match) the data for location records matched by the author/title key, or (if the author/title key failed to match) the data for the

location record matched by the title identifier. The Title List Administrator can determine from the information provided if the identifier or key on the input record is in error, or if the corresponding title record needs to be added to the data base,

7.2.2 Input Processing for Contributed Bibliographic Records

For the most part, processing of bibliographic records is essentially the same as for contributed data. It will probably be necessary to go through a pre-processing phase in which the author/title key is automatically generated and the library identifier, title identifier and author/title key are put into a standard structure, possibly the same as that used for contributed data batches. If the No-Match condition is raised, the bibliographic data can be used automatically to add a title record to the data base. For the Possible Match and Mis-match cases, the bibliographic data from the input records should be displayed on the corresponding Lists and saved in the corresponding temporary computer files for subsequent use.

7.2.3 Addition of Title Records

As indicated by the preceding description of input processing, title records can be added to the data base from either of two sources. The simplest way to add a record is to keyboard the necessary bibliographic information from the catalog card or accession list sent by the contributing library. It may be necessary first to edit that information to add an LC card number, put a subject heading into proper form, etc. Other than checking for the presence of required data elements, the computer processing program should accept the data as keyboarded, and will generate the appropriate author/title key and, if necessary, assign a pseudo title identifier.

Title records can also be added through processing a MARC or other machine-readable record to extract the data needed for the state data base. A special pre-processing routine will be needed to provide for reading in and identifying the data elements in each record format used by the various sources for machine-readable records. Once pre-processed, the data can be handled in the same way as for keyboarded records.

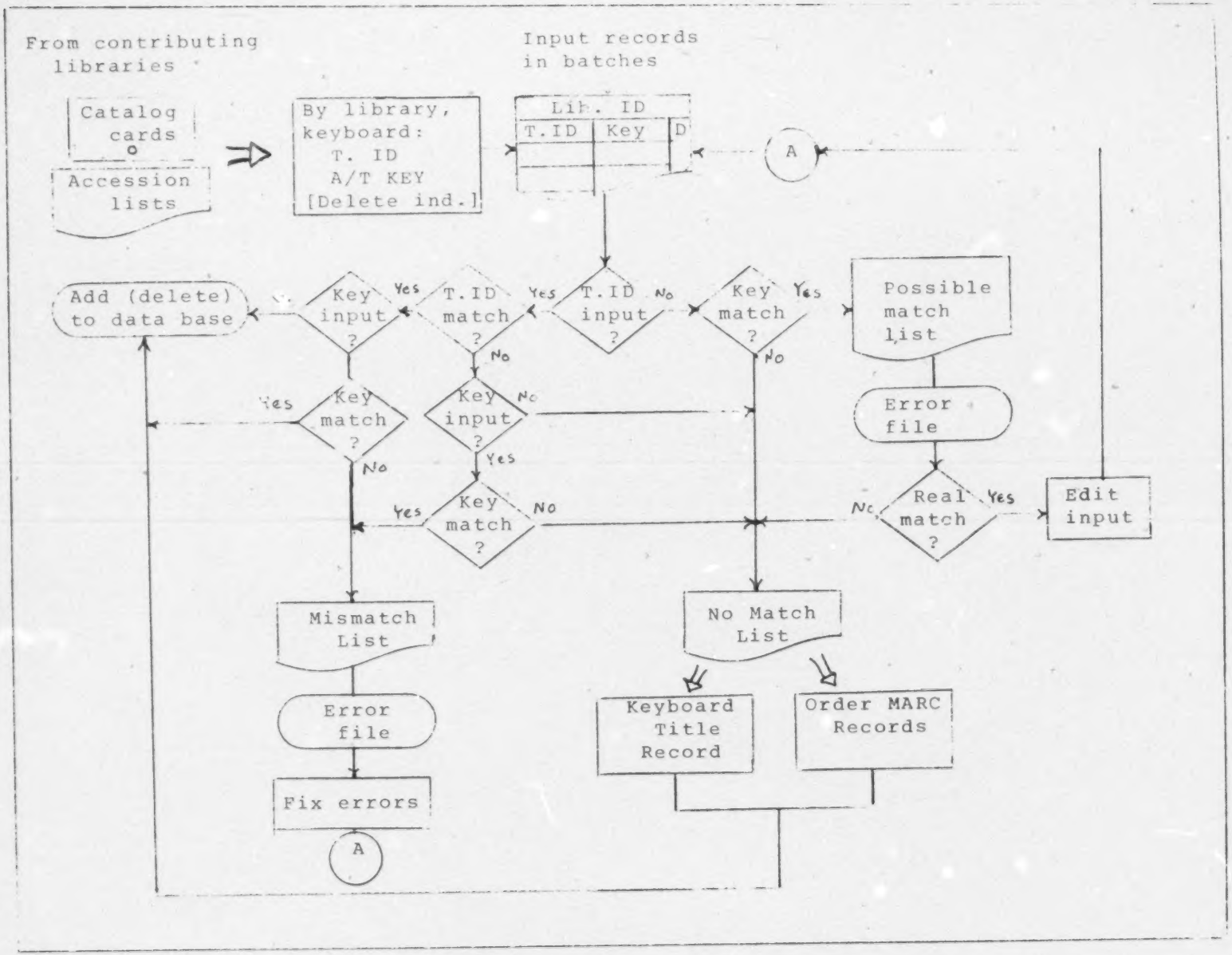


Figure 3. Input processing block diagram for contributed data.

8. SUGGESTED IMPLEMENTATION PLAN, SCHEDULE AND BUDGET

8.1 RELATION TO STATE NETWORK PLAN

There are a number of tasks and activities to be accomplished in implementing the statewide title location list and in ensuring that it is employed effectively in Colorado libraries. First, the plan for the title list, together with the draft Colorado Library Network Plan, must be reviewed by Colorado librarians and modified as necessary to fit their comments and suggestions. While implementation of the title location list could proceed independent of the setting up of governance and administrative structures envisioned in the state network plan, it would be most desirable to carry on these activities as an integrated whole. The title location list by itself is only one piece of a comprehensive cooperative effort, and its value will be greatly enhanced by progress on the interlibrary loan, communications and reference service programs of the network plan.

At the same time, implementation of the title location file will provide an immediate opportunity for the people involved in state networking to focus their energies on accomplishing a major project that will give a good shakedown for other parts of the network plan. For example, while the State Library staff works on the technical aspects of creating the file, the system headquarters must begin planning a training program and developing procedures for interlibrary loan based on use of the title location list. Additionally, the State Library, regional systems, and library associations must begin working out the details for collecting and compiling the information to be published in the resource directory. An advisory task force should be created to consider special technical questions where matters of policy are involved; e.g., the form of the library identifier, development of pseudo title identifiers, inclusion or exclusion of certain materials, form of entries on the lists, whether library call numbers should be included, and the need for a state cataloging data base for non-print and document materials.

Perhaps this task force should also address the matter of what statistics will be needed to evaluate the title location list and its utility in improving interlibrary loan. At least on a sampling basis, local libraries and regional library service systems will have to track ILL requests to note the volume of flow among libraries within a system, between one system and another or state resource centers, and requests sent out of state. Performance measures should include data on response time, the ratio of requests to fills, and the proportion of locations found through the statewide title location list, access to on-line data bases, and other methods.

Local librarians have an active role in developing the title location file and supplemental resource directory. They will be called upon to perform a kind of triage on their collections: determining which materials should be described in the resource directory, which should be included in the title location file, and which are so outdated, or of temporary interest, or so likely to be generally available, that they should not be included in a location file. There is no point in including materials in a location list that would hardly ever be asked for.

Proper staffing is of critical importance. Although computer program development, file generation and maintenance, and production of the title location lists will most likely be contracted out, the State Library has the overall responsibility for:

a) Convening and supporting the advisory task force.

b) Preparing requests for proposals, bids or quotations (RFPs, RFBs or RFQs) from prospective contractors (including the Colorado Department of Education Data Processing Center).

c) Selecting contractors and suppliers and monitoring their performance.

d) Providing or supporting training for Colorado librarians so they can take best advantage of the title location capability.

e) Collecting and analyzing ILL statistics for evaluating the effectiveness of the title location list.

f) Suggesting changes in ILL procedures and policies, and in the title location file, to improve interlibrary service efficiency, effectiveness and equity.

g) Integrating the title location file with other elements of the Colorado Library Network.

The State Library's Network Coordinator would be the logical choice to carry out the above responsibilities if that position is retained. Under supervision of the Network Coordinator, a Title List Administrator should be employed to oversee production of the title location list and the editing and publication of the title location list and the resource directory. This person should have experience in interlibrary loan, writing and editing, and library data processing. Specific duties will include:

a) Coordinating data inputs, maintenance, and production of lists;

b) Contracting or arranging for file maintenance and production services;

c) Supervising the keying of input location and title records;

d) Editing records for which there are exception conditions;

e) Suggesting ILL policy changes to take advantage of technology;

f) Suggesting and enforcing agreed-upon standards and procedures;

g) Evaluating data base operation and use;

h) Supporting continuing education for librarians and users;

i) Maintaining and improving capability to interface with regional, other state, and national systems.

8.2 TASKS TO IMPLEMENT THE COMPUTER-BASED FILE

There are several tasks to be performed concurrently as the preparatory step for implementation:

a) Choose a data base as a starting point for the state file. It is desirable to generate at the beginning a file with at least 75,000 title records for materials published within the last seven years or so to ensure that the first lists produced will indeed be found useful. Although the Jeffco data base is larger and located in a more populous area, the Penrose Public Library, Colorado Springs, file may be more attractive because it includes the LC card number for materials. In either case, provision must be made for the likelihood that inclusion of their retrospective holdings data may cause a temporarily high loan demand over the first few years while more holdings of other libraries are being added. If the Denver Public Library's catalog is available in time in machine-readable form, and can be segmented by publication date, then it would be desirable to include their holdings acquired over the past five years.

b) Develop specifications for preparing entries in the resources directory and issue them to the regional library service systems and library associations so they can begin collecting the information. If computer assistance will be used to create directory indexes or perform text editing, the corresponding computer system specifications must be written and a developer selected.

c) Request bids from potential suppliers of MARC records. There are two vendors, Baker and Taylor and Josten's, that between them supply catalog cards for 25% of acquisitions by Colorado libraries. An attempt should be made to negotiate a contract with them to provide on a monthly basis a tape containing a copy of all cataloging records from which they furnished catalog cards to Colorado libraries, together with the identification of the libraries so supplied. In addition, these vendors may be invited to bid on furnishing MARC records corresponding to the LC card numbers or author/title keys provided by the Colorado State Library. Other vendors such as Auto-Graphics, Bro Dart, Ember Associates, Xerox University Microfilms, and Blackwell should also be invited to bid on supplying MARC records. As a very rough guess, approximately 10,000 MARC records per year might be purchased, over and above the records received from Baker and Taylor and Josten's.

BALLOTS might be considered as an alternative source. In using BALLOTS, the experience of the Nevada State Library's Cooperative Services Division (Mrs. Rae Clemison, Director) may be a guide, A clerk at the BALLOTS terminal could call up records, working from the No Match and Mis-match Lists, immediately verify which record was needed, append the appropriate Colorado library identifier(s), and have a copy saved for shipment to the State Library. The cost for the operator and telecommunications required for this alternative may be lower because it would avoid some additional verification and editing steps that might have to be performed on MARC records received from other suppliers.

d) Prepare data entry specifications and associated instructional materials. Not all location data can be contributed by participating libraries in the form of extra catalog card copies. They will need forms and instructions for submitting needed bibliographic data for materials where catalog cards or accession lists are not available. A special form may also be needed to record that a title is no longer held by a participating library, and that library's identifier should be deleted from the corresponding title record. As soon as preliminary details are clear, contributors should be asked to start sending in their holdings information for all new acquisitons.

e) Prepare specifications for the file generation, maintenance and list production computer-based system. These specifications (an elaboration of Section 6) need to be sufficiently detailed that they can be used to request bids from vendors and the Colorado Department of Education computer center for developing and installing the system.

The above tasks must be performed concurrently over the first three months of the implementation period. Thereafter, development proceeds along a reasonably straight line:

f) Develop, install, and test the computer-based system for the title location file. The Title List Administrator must be prepared to furnish sample input data needed for testing the computer programs during development. As a minimum, such data will include: MARC records, records from the data base selected as the basis for the file, records from Baker and Taylor and Josten's, and keyboarded title and location input records. During this time the Administrator should also be developing acceptance test procedures and data by which the installed computer system can be exercised to verify that it meets all specifications satisfactorily. The acceptance testing should be completed by the end of the seventh month, and all should then be in readiness to begin the generation of the initial file.

g) Plan training of local librarians and prepare training materials. Training packages need to be prepared and tested for the regional library service systems to use in preparing their members to take advantage of the title location list and resources directory as soon as they are published. Training should begin, using test outputs generated during acceptance testing, at about the ninth or tenth month. Earlier, it may be desirable to insitute searching of on-line catalog files to provide location information.

h) Conduct a survey of current ILL traffic patterns and costs among Colorado libraries to obtain baseline data to be used in evaluating the impact of the title location file on interlibrary loan service. The WILCO Cost and Funding Studies data collection instruments should be adapted for use in this survey. Requirements should also be established for monitoring ILL traffic patterns on an ongoing basis to obtain the information necessary for improving the title location file and its use.

i) Generate the initial title location file. Once acceptance testing is completed, initial file generation should begin with the loading of the basic data base selected. With this step completed, the data supplied by Baker and Taylor and Josten's should be added. The third step is to begin inputting the location data from contributing libraries. In the early stages of adding this data, a large number of No Match records can be expected, and MARC records may have to be acquired from suppliers on a weekly basis. Later, as the file grows larger, a bi-weekly or monthly schedule may be satisfactory. It is also to be anticipated during this period that there will be a number of problems with the computer system, and these must be corrected as quickly as possible in order not to hold up file generation.

j) Produce and distribute the first edition of the title list. Shortly before the initial file generation is completed, another test should be run of the list production process, including the production of microfiche lists. This will ensure that corrections and changes introduced in the computer system as problems were detected

during file generation have not affected the list production module. The actual production of the title list should require little time to accomplish. It would probably be desirable to schedule the printing and distribution of the first edition of the resources directory to coincide with issue of the first microfiche lists.

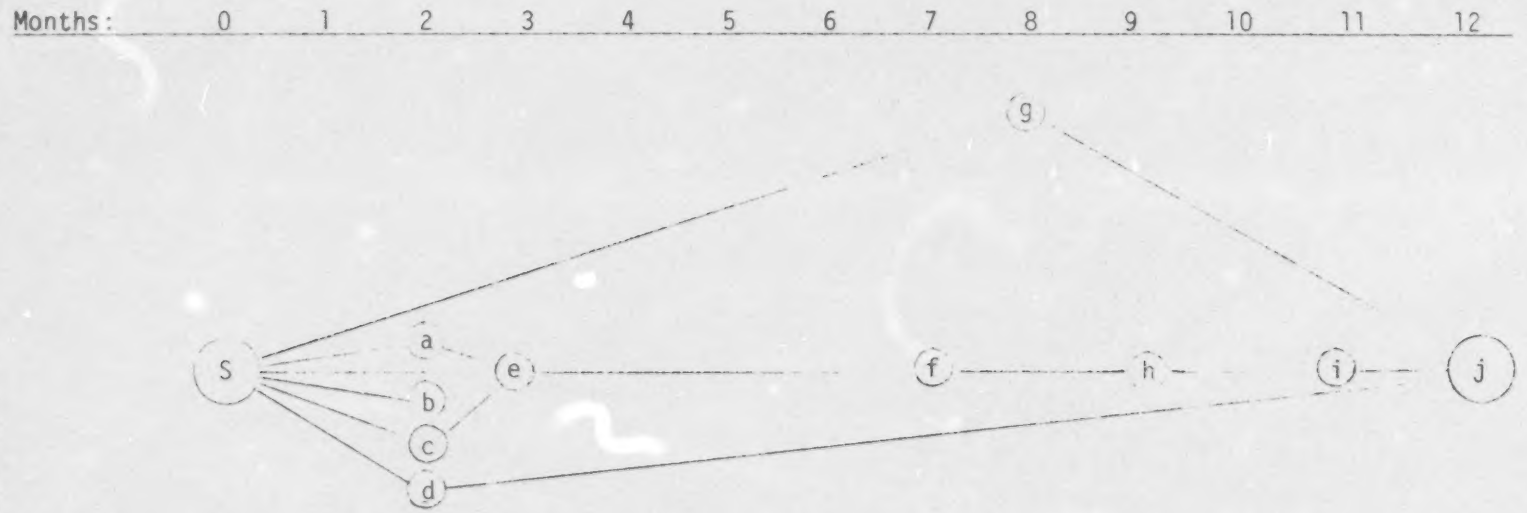
A final, but unending, task is to evaluate the utility of the title location file and modify its content and production as needed. The State Network Coordinator should plan on making a formal evaluative study, with the assistance of librarians, regional systems, and library associations, after the title location list has been in use for a year or two. The results of this evaluation should be published for use by librarians in other states who may be considering developing location lists in their states.

Figure 4 shows, in PERT-like form, the schedule for performing the tasks to implement the statewide title location file. Note that lines between milestones indicate that the succeeding task is dependent upon work performed in the preceding task(s). Assuming that implementation can begin on or before 1 July 1977, the first edition of the title list should be in the hands of users by the end of June 1978.

8.3 BUDGET ESTIMATE

This budget estimate is based on both analysis and guesswork respecting the data collected in the survey of Colorado libraries and visits to the Penrose Public Library, Colorado Springs, and the Jefferson County Public Library. There are four major cost elements: personnel, file updating, list publication, and amortization of the investment for programming and generating the initial file. Personnel and amortization expenses are essentially fixed, although it may be that the Title List Administrator could be assigned some additional tasks after the first year and thus reduce the personnel expense attributable to maintaining the title list file and editing the resource directory.

The main factor affecting the expense for file updating and list publication is the number of title records in the file. At some point, the cost of adding more title records to the file exceeds the value for interlibrary loan of having those titles on the list. The trick is to be able to forecast which titles are least likely to be requested on interlibrary loan. Because a comprehensive title location list has not been made available before for use by patrons of all types of libraries, it would not be wise to base a forecast on data and experience reported in other situations or on a priori assumptions. For example, one might decide to exclude juvenile titles, but should this be done before finding out if the availability of the title list leads to a demand on ILL for such materials? The safer course would



Milestone List

S - staff available, advisory task force appointed
a - starting data base selected
b - specifications for resource directory prepared
c - sources of supply for MARC records determined
d - data contribution specifications and forms prepared
e - computer system specifications completed, ready for bid
f - computer system development, installation and acceptance testing completed
g - training plan and materials prepared
h - survey of current ILL traffic patterns and costs completed
i - initial file generation completed
j - first edition published and distributed

Figure 4. Schedule for Implementation of the Statewide Title Location List

be to conduct a detailed study of ILL activity at least one year after the title list has first been published. The study should be designed to provide the data needed to determine what kind of materials are least likely to be requested through interlibrary loan.

Another major factor affecting the expense for list publication is the frequency of publication. The budget estimate assumes a semi-annual total cumulation and publication, which may be less desirable than a 3 or 4 times a year schedule. It may be better to go instead with an annual total cumulation and a quarterly supplement cumulating the preceding quarters' additions to the files. Such a schedule should result in a slightly lower annual cost but may be a bit inconvenient for users.

The estimates for computer time, keyboarding, and COM production are based on data the author used in 1974 and 1975 in running a bookform cataloging service and probably should be refined through obtaining price quotations from vendors and the Colorado Deaprtment of Education computer center. Note also that the estimate includes direct costs only for personnel, although the other cost elements are assumed to be fully loaded prices charged by whatever organization might provide the service. Finally, note that cost elements 2, 3, and 4 for the first year represent the investment in creating the title file management system and initial file.

BUDGET ESTIMATE FOR FIRST YEAR

		Detail	Total
1)	Personnel		
	Title List Administrator (100%)	15,000	
	Secretary (33%)	3,000	
	Benefits @15%	2,700	20,700
2)	Computer System Development		
	Analysis and programming, 8 mos @$2,000	16,000	
	Computer time, 6 hrs. @$250	1,500	17,500
3)	Initial File Generation (Penrose and Jeffco)		
	115K MARC records @ .05*	5,750	
	65K title records keyboarded	9,750	
	Computer time, 14 hrs. @ $250	3,500	19,000
4)	Advisory Task Force Meeting Expenses		1,000
5)	File Updating		
	15K MARC records @ .05	750	
	140K MARC holdings records from B&T, Josten's @ .06	8,400	
	50K title records keyboarded @ .15 (7.50/hr., 200 chars/record)	7,500	
	175K holdings records keyboarded @ .03 (20 chars/record)	5,250	
	Computer time, 20 hrs. @ $250	5,000	26,900
6)	List Generation		
	Computer time estimated 250K title records, 10 hrs @ $250	2,500	
	COM setup charge	100	
	Fiche masters: 30 entries/page, 94 pages/fiche = 90 fiche x 3 divisions = 270 + 30 fiche for LCCN Index = 300 fiche @ $3.00	900	
	Copies @ .10 = $30/set x 200 libraries	6,000	9,500
7)	Directory Printing		
	300 copies, 350 pages, with covers		2,500
8)	Equipment		
	Fiche reader, computer terminal @ 200/mo.		2,400
	FIRST YEAR TOTAL:		$99,500

*"K" = 1,000

BUDGET ESTIMATE FOR SECOND YEAR

	Detail	Total
1) Personnel, 20,700 + 7%		22,150
2) File Updating		
Data entry	21,600	
Computer time, 22 hrs. @ $250	5,500	27,100
3) List Generation		
250 + 50 = 300K titles = 9,500 = 20% per printing = 11,400; at least 2 printings should be made		22,800
4) Equipment		2,400
Amortization (categories 2+3+4 from first year = 37,500 ÷ 5)		7,500
SECOND YEAR TOTAL		$81,950

APPENDIX A

COMPARISON OF COSTS FOR CURRENT, ON-LINE, AND OFF-LINE TITLE LOCATION METHODS

COMPARISON OF COSTS FOR CURRENT, ON-LINE, AND OFF-LINE TITLE LOCATION METHODS

From observations made in the course of the Cost and Funding Studies, the times shown in Table 2 can be estimated for various steps in the processing of interlibrary loan requests under each method.

Table 2. Processing Times for ILL Requests Under Current, On-Line and Off-Line Methods of Title Location (In minutes)

Processing Step	Current	On-Line	Off-Line
Borrower verification	7	6	2
Borrower location determination	3	0	0
Borrower request preparation	2.5	2.5	1.5
Search OCLC	0	1.5	0
Lender verification	6	2	2
Lender catalog check, message handling	5	5	5
TOTAL	23.5	17.0	10.5

If a title and its location can be found on a microfiche list, under the off-line method, no additional verification must be done and no time must be spent trying to find a location. The complete citation need not be included in the ILL request; just the LC card number and title will be sufficient to let the receiving library find the citation in its own catalog in most cases.

In the on-line method, the borrowing library's procedure for verification does not change much (although if that library has OCLC also, a little bit of time may be saved). The lending library may still have to do the full amount of verification for a few requests as it does now under the current method. The time to find a location through OCLC is probably about the same as finding a location through the current method, but the OCLC search would be needed for only the half of the requests which were for materials not held by the receiving library.

Currently, there are about 50,000 loans made annually by Colorado libraries. About 12,500 requests are received by libraries which do not own the requested material. The average direct labor cost per minute for the activities shown in Table 2 is about $.10. Putting these figures together, the cost for ILL under the current method is:

50,000 loans @ $2.35	= $117,500	for filled requests
12,500 requests @ 2.60	= 31,375	for useless requests, including postage
	$148,875	

The estimated cost for the on-line method is a bit more difficult to pin down because in addition to the ILL processing there would be costs for OCLC terminals and the difference in cataloging prices of about $1.50 between OCLC and commercial services. It seems safe to assume that at least four public libraries, with a combined acquisitions of 30,000 items, and which would not otherwise be OCLC users, would have to be subsidized to provide OCLC access for ILL; this cost would be about $45,000. For ILL processing, there should be no wasted requests sent to libraries that do not have the materials, but it will be necessary to send some requests from the library doing the OCLC searching on to another library shown to hold the material requested. That second library should use only the 5 minutes for checking its catalog and handling the request message; in addition, there would be the postage cost for sending the request on. Putting all these figures together, the cost for ILL for the on-line method is:

50,000 requests @ $1.70	= $85,000	handled by OCLC library, 1/2 filled
25,000 fills @ .65	= 16,250	filled by a second library
Subsidizing OCLC at 4 public libraries	45,000	
	$146,250	

The estimated cost for the off-line method assumes that it is used in combination with the on-line method because most academic libraries expect to use OCLC for their cataloging. As an admittedly wild guess, the off-line title location list would account for filling half the ILL requests (since academic libraries account for only 15,000 of the 50,000 total loans), and OCLC searching would provide location assistance for the other half of ILL requests, with 10,000 being sent on to a second library for filling. The cost for producing the off-line title location list (detailed in Section 3.3) is about $80,000 per year.

25,000 loans @ $1.05	= $26,250	filled using list
25,000 requests @ $1.70	= 42,500	searched via OCLC
10,000 fills @ $.65	= 6,500	filled by a second library
Off-line list production	= 80,000	
	$155,250	

As a final step, in view of the fact that ILL volume has been

increasing fairly steadily, it would be helpful to perform the same calculations assuming a level of 75,000 loans per year:

Current Method:

75,000 loans @ $2.35	=	$176,250
18,750 requests @ $2.60	=	47,062
		$223,312

On-Line Method:

75,000 requests @ $1.70	=	$127,500
37,500 fills @ $.65	=	24,375
OCLC subsidy	=	45,000
		$196,875

Off-Line Method:

37,500 loans @ $1.05	=	$39,375
37,500 requests @ $1.70	=	63,750
15,000 fills @ $.65	=	9,750
Off-Line list production	=	80,000
		$192,875

At this higher level of ILL volume, the on- and off-line methods begin to become more economical than the current method.

APPENDIX B

PROVIDING ACCESS TO SERIALS

PROVIDING ACCESS TO SERIALS

Although the WILCO study was limited to non-serial materials, a recent brief report issued by the National Commission on Libraries and Information Science prompts this suggestion for improving access to serials materials for Colorado libraries.

Almost 50% of the total number of interlibrary loan requests made by academic libraries, 6% of the requests made by public libraries, and (as a guess) about 50% of requests made by special libraries are for copies of articles appearing in periodicals and other serials.*

An NCLIS-sponsored Task Force on a National Periodicals System is recommending a three-level national periodicals program. Level 1 would consist of state and regional libraries who would be responsible for satisfying a "substantial" (70-80%) portion of routine needs for periodicals. Level 2 would be a National Periodicals Center, to be established at the Library of Congress in the 1978-1979 time frame, which would have a comprehensive collection dedicated for lending purposes to meet the majority of requests not met by Level 1. Level 3 would consist of existing national libraries and other unique collections that will serve as a backup to the other two levels.

About 50% of all periodicals loan requests can be satisfied from a collection of 2,000 journals. An additonal 40% of the requests can be satisfied with just 8,000 more journals.**

This information suggests that, in planning for a Colorado state library network, there may be a better alternative for satisfying loan requests for periodicals than the proposed union list of serials. It would cost about $50,000 to prepare the first edition of a comprehensive state union list (taking all costs into account except labor contributed by local libraries in checking off on a list of titles the journals they have, plus providing holdings information. This money might be spent in a more useful way.

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*Studies by WESTAT and WILCO came up with almost the same fiture for academic library requests for periodicals; the WILCO Cost and Funding Studies Summary provides the 6% figure for public libraries.

**Alphonse F. Trezza. "Toward a National Periodicals System." Special Libraries, vol. 68, no. 1, January 1977, pp 7-12.

In place of a union list of serials, the State Library should instead prepare a list of journals showing:

a) what titles should be available within each regional library service system for meeting a substantial number of loan requests (500-1,000 titles); each system would then designate a particular library to be responsible for filling requests for those journals;

b) what titles should be available in the two State Resource Centers as a backup for the regional library service systems (the second thousand titles and as many more of the additional 8,000 as these Centers may have already); and

c) other journal titles held by Colorado libraries agreeing to service loan requests for those journals.

The actual titles to be included in the first two parts of the list should be determined by on-going analysis of ILL statistics, with the goal of filling perhaps the first 1/3 of periodicals requests within the region and the second 1/3 from the collections of the State Resource Centers. Local libraries would check the list to see where, exactly, to send a request for a periodical: to a library in the region, to a Resource Center, to some other Colorado library or (eventually) to the National Periodicals Center. Loan requests would be handled directly between the requesting and lending libraries, with no intermediate handling that might delay response and would increase handling costs.

Local libraries have a responsibility to their patrons to provide the most needed periodicals, and it is necessary that the ILL capability not be used as a means of avoiding this local responsibility. The state network could employ a pricing mechanism to regulate ILL use (and incidentally to foster compliance with the new copyright law). For example, a price of $2.50 per photocopy could be established as a standard for Colorado libraries filling requests for other Colorado libraries. A library having to request several articles from the same periodical would therefore be 'encouraged' to subscribe to that periodical. The price should be sufficient to cover all costs for the service incurred by libraries that are reasonably efficient in handling their interlibrary loan activities; the $2,00 suggested price is based on the charge made by the self-supporting Associated Colleges of the Midwest Periodicals Bank in Chicago.

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